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GEHRIG (R. F.) & KNIGHT (S. G.). **Formation of ketones from fatty acids by spores of Penicillium roqueforti.**—*Nature, Lond.*, **182**, 4644, p. 1237, 1958.

In a study at the Dept of Bacteriology, University of Wisconsin, of the aromatic ketones which impart the typical flavour to cheeses made with *P. roqueforti*, the formation of 2-heptanone was used as a measure of the ability of the cells to form ketones from fatty acids. The rate of ketone formation was directly proportional to the rate of sporulation, and was also directly related to O uptake. All absorbed O was used in ketone formation by the spores and they did not germinate. Once induced to germinate, the spores lost their ability to form ketones. It is concluded that spores of this fungus are concerned in a series of reactions unrelated to dormancy and germination.

JEREBZOFF (S.). **L'extrait de levure contient un facteur qui permet la formation de zonations chez Monilia fructicola développé a l'obscurité et sous éclairement continu.** [Yeast extract contains a factor which permits the formation of zonations in *M. fructicola* developed in darkness and under continuous illumination.]—*C. R. Acad. Sci., Paris*, **247**, 17, pp. 1384–1387, 1 diag., 1958.

Zonation occurred in cultures of *M.* [*Sclerotinia*] *fructicola* [**37**, pp. 454, 578] on potato extract enriched with 5 g./l. yeast extract, the period of endogenous rhythm extending over 16 hr. under continuous illumination compared with 24 in the dark.

TURIAN (G.). **Sur l'action 'mutagène' de l'acide nitreux chez les Chaetomium.** [On the 'mutagenous' action of nitrous acid on *Chaetomium*.]—*Phytopath. Z.*, **33**, 2, pp. 147–152, 2 fig., 1958. [German and English summaries.]

The author points out that in previous work [**35**, p. 415], owing to confusion between the small perithecium of *C. indicum* and the pycnidium of *Chaetomella horrida* because of the very rapid dissolution of the ascal walls in this *Chaetomium*, the antibiotic properties of the fungus studied concern *C. indicum* and not *Chaetomella horrida*.

MIKOLA (P.). **Metsämaan kantasienien puhdasviljely.** [Growing forest soil Basidiomycetes in pure culture.]—*Karstenia*, **3**, pp. 5–16, 40 fig., 1955. [Finnish. Abs. from English summary.]

At the Metsäntutkimuslaitos, Helsinki, the tissue culture method as improved by Modess [**22**, p. 104] was used to obtain pure cultures of 80 spp., most of which were able to grow when initially cultured on agar or liquid media, but some, which at first would only grow in liquid, were able to colonize agar on transfer. The appearance and growth habits of the mycelia, which are described for about half the isolates, and the presence or absence of clamp connexions and chlamydospores were noted to be characteristic for each sp., though prolonged culturing could produce considerable differences between strains of one sp.

CURTIS (R. W.). **Root curvatures induced by culture filtrates of Aspergillus niger.**—*Science*, **128**, 3325, pp. 661–662, 1 fig., 1958.

At Purdue University, Lafayette, Indiana, culture filtrates of *A. niger* applied to the growing points of bean [*Phaseolus vulgaris*] seedlings caused stem curvature, thickening and tumescence of stems and petioles, curvature of the internodes, and twisting (*Plant Physiol.*, **33**, p. 17, 1958). Only the roots of maize seedlings

appeared to be affected (root curvature), apparently by the same substance present in the filtrate.

STODOLA (F. H.). **Source book on gibberellin. 1828–1957.**—x+138+426 (unnumbered) pp., [? Peoria], Agricultural Research Service, U.S. Dept Agric., 1958.

This treatise, prepared by the Northern Utilization Research and Development Division, Peoria, Illinois, deals in Part I with the bakanae disease of rice and its causal organism, *Gibberella fujikuroi* (*Fusarium moniliforme*). The 14 chapters include detailed accounts of the disease (pp. 1–40) and the fungus, covering the morphology, cultural characteristics, physiology and taxonomy (pp. 41–51). Subsequent chapters deal, *inter alia*, with the effects of the gibberellins on microorganisms (p. 104); the fusaric acids (pp. 108–109); and other products of *G. fujikuroi* (p. 110). Part II contains abstracts of 632 papers, mostly taken from this *Review* and other abstracting journals, and arranged alphabetically under authors.

GOTTLIEB (D.), CARTER (H. E.), SLONEKER (J. H.), & AMMANN (A.). **Protection of fungi against polyene antibiotics by sterols.**—*Science*, **128**, 3320, p. 361, 1958.

At the Depts of Plant Pathology and Chemistry, University of Illinois, Urbana, the action of the antibiotic filipin [**35**, p. 32] on *Penicillium oxalicum* was completely inhibited by a mixture of carotenoids obtained by crude hexane extraction of carrots: the active fraction, a sterol, was a white material readily crystallized from methanol/water. Other sterols and other antibiotics were then tested on *P. oxalicum*, *Aspergillus niger*, and *Hansenula subpelliculosa*. The activity of filipin and fungichromin was the most readily inhibited, followed by amphotericin B, trichomycin, and rimocidin: candicidin A and B, ascosin, and nystatin were only slightly affected. Of the sterols tested, cholesterol, ergosterol, sitosterol, stigmasterol, and, to a slight degree, lanosterol, inhibited the action of filipin on *H. subpelliculosa*. Ergosterone gives effective reversal of filipin activity.

The evidence suggests that sterols play a much more important role in the growth processes of fungi than has hitherto been recognized; probably they are essential.

BRANDT (C. S.). **Special jubilee symposium: air pollution with relation to agronomic crops.**—*Agron. J.*, **50**, 9, pp. 544–568, 12 fig., 19 graphs, 1958.

This symposium was held at Atlanta, Georgia, on 20 Nov. 1957.

M. D. THOMAS (pp. 545–550, 39 ref.) summarizes the general status of research on the effects of air pollution on plants, with particular reference to SO_2, F compounds, and smog.

W. M. NOBLE & L. A. WRIGHT (pp. 551–553, 9 ref.) describe a bio-assay method for the study of air pollution: healthy *Poa annua* indicator plants, raised in a greenhouse supplied with carbon-filtered air, are transported to the locality to be assessed in special containers and exposed for 24 hr. The damage, appearing as a band on the blade, is easily measured. Petunia plants, also very sensitive and rapidly developing a silver leaf reaction, are used as qualitative controls.

G. A. COLE (pp. 553–555), dealing with vegetation survey methods, describes how smoke dispersion patterns, taken in conjunction with observations on a range of indicator plants (blackberry, *Ambrosia trifida*, *Helianthus* sp., *Geranium carolinianum*, and *Quercus marilandica*), were used in a study of the effects of fumes from steam electric plants in the Tennessee Valley.

At the University of California Citrus Experiment Station, Riverside, O. C. TAYLOR (pp. 556–558, 9 ref.) recorded a significant suppression of growth of rooted Lisbon lemon cuttings, Lisbon lemon on Troyer citrange stock, and grapefruit seedlings [**35**, p. 98], without visible leaf symptoms, by exposing them to synthetic smog [**36**, p. 48]; suppression of growth by natural Los Angeles smog was less pronounced, possibly because of partial recovery during smog-free periods. The

lemon leaves were shed early as a result of premature senescence. Both synthetic and natural smog suppressed blooming of petunias and prevented fruit set in tomatoes. Transpiration from lemon cuttings and lemon scions was reduced by 25% in artificial smog.

B. L. Richards, J. T. Middleton, & W. B. Hewitt (pp. 559–561, 4 ref.) describe 'oxidant stipple', brown to black punctate lesions in vine leaves [loc. cit.] exposed to polluted air. This condition, 1st seen in summer 1954 in vineyards E. of Los Angeles and near San Bernardino, can be induced by exposure to ozone.

H. C. Hill, L. G. Transtrum, M. R. Pack, & W. S. Winters (pp. 562–565, 15 ref.) report an investigation into the 'hidden injury' theory of fluoride damage to plants. Tomato plants, exposed continuously to hydrogen fluoride, performed normally even when there was visible leaf injury. It is concluded that 'hidden injury' to crops probably does not occur at the levels of gaseous fluoride to be found in the atmosphere of industrial cities.

E. D. Hansen, H. H. Wiebe, & W. Thorne (pp. 566–568) report increased fluoride uptake by turnips and lucerne growing in soils supplemented with sodium fluoride and sodium fluorosilicate. Higher levels of clay, lime, and organic matter reduced fluoride uptake. Yields were generally reduced when the level in the shoots exceeded 60 p.p.m. Under field conditions fluoride contamination apparently occurs directly from the air, not by way of the soil.

Castellani (E.). **Fotosensibilità e fotosensibilizzazione nelle piante.** [Photosensitivity and photosensitization in plants.]—*Atti Soc. ital. Pat.*, **5**, 1a (*Relazioni*), pp. 277–295, 1957. [76 ref. English summary. Received Dec. 1958.]

The author reviews and discusses the present state of knowledge concerning the direct and indirect effects of visible light upon all plant functions, including its effects upon viruses, bacteria, and phytopathogenic fungi.

Lasting (V. P.) & Gurfel (D. B.). К методике количественного учета грибов в почве. [A method for the quantitative assay of soil fungi.]—*Microbiology, Moscow*, **25**, 5, pp. 610–611, 1 pl., 1956.

At the Institute for Plant Breeding, Estonian Academy of Science, wort agar with streptomycin (40–50 μg.) gave a much clearer indication of soil fungi than malt agar. Higher doses of streptomycin (75 μg.) caused degeneration of some fungi (*Alternaria*, *Verticillium*, etc.). Not only were mycelial fungi detected but also high numbers of yeasts.

Voronkevich (I. V.). Антагонизм микроорганизмов в почве и перспективы его использования в борьбе с почвообитающими возбудителями болезней растений. [The antagonism of micro-organisms in the soil and prospects for their use in the control of soil-borne causal agents of plant diseases.]—*Adv. mod. Biol., Moscow*, **46**, 2 (5), pp. 145–155, 1958. [72 ref.]

This is a review of work done in U.S.S.R. and elsewhere in the past 30 yr. on the use of soil micro-organisms in the control of soil-borne plant pathogens.

Loizides (P. A.). **Mineral deficiencies in various crops and methods for diagnosing and restoring them.**—*Bull. Dep. Agric. Cyprus* 3, 20+iv (unnumbered) pp., 6 fig., 1958.

Notes, mainly for extension officers of the Agricultural Dept, comprising introductory sections on plant nutrition and diagnosis of deficiencies, followed by details of the correction of specific deficiencies in various crops.

Ollagnier (M.) & Prévot (P.). **Principales carences minérales de l'Arachide, du Palmier à huile, et du Cocotier en Afrique Française.** [The chief mineral

deficiencies of Groundnut, Oil Palm, and Coconut Palm in French Africa.] —*Qual. Plant Mater. veg.*, **3–4**, pp. 550–568, 3 fig., 13 graphs, 1 map, 1958. [11 ref. English and German summaries.]

In groundnuts in Senegal [**38**, p. 119] N deficiency occurs rather frequently, while P deficiency is general, K deficiency is somewhat uncommon, and no definite Ca deficiency has been noted. Ca may provoke Mn toxicity, but on the other hand it increases germination and oil content and reduces the number of empty cavities. Experimental evidence demonstrated that the increases in yields brought about by applications of $(NH_4)_2$ SO_4 were due to the S. Only 1 definite case of Mo deficiency was found in groundnuts.

Marked K deficiency was observed in a planting of oil palms at Dabou, Ivory Coast [cf. **36**, p. 401], and in another at Pobé, Dahomey. Spectacular results were obtained at Port-Bouet, Ivory Coast, by the application to coconut plantings of 1·5 kg. KCl/tree/yr.; there was a secondary effect on the nuts, those from treated plots giving better seedling growth than those from untreated. The use of K fertilizer alone since 1952 has, however, recently induced a secondary Mg deficiency [cf. **37**, p. 733].

Bibliography of systematic mycology 1957.—41 pp., Kew, Commonwealth Mycological Institute, 1958. 7*s.* 6*d.*

A list of 830 titles of publications, many of which are not noticed in *R.A.M.*, grouped under the headings, general, lists, nomenclature, cultures, obituaries, and the systematic groups, with an author index.

Viennot-Bourgin (G.). **Contribution à la connaissance des champignons parasites de l'Iran.** [A contribution to the knowledge of the parasitic fungi of Iran.]—*Ann. Épiphyt.*, **9**, 2, pp. 97–210, 14 pl., 3 fig., 1 map, 1958. [53 ref.]

This annotated list of fungi collected mainly on the lofty plateaux of Azerbaijan in 1957 [cf. **33**, p. 320; **36**, p. 554] includes 4 new spp. of *Puccinia*, 3 of *Uromyces*, and 2 others. A host index is appended. There are 7 Peronosporales, 24 Erysiphaceae, 79 rusts, 12 smuts, and 29 miscellaneous species noted, including *Podosphaera leucotricha* [map 118] on apple, *Coryneum beijerinckii* [*Clasterosporium carpophilum*: map 188] on cherry and almond, *Sclerotium rolfsii* [map 311] on *Capsicum annuum*, apple, tea, and *Albizzia julibrissin*, and *Ophiobolus cariceti* [*O. graminis*: map 334] on wheat.

Other species noted include: *Erysiphe communis* [*E. polygoni*] on beet, *Puccinia carthami* on safflower, *Sphaerotheca fuliginosa* on cucurbits, *Uredo dianthicola* on *Dianthus* var. hort., *Uromyces gypsophila* on *Gypsophila elegans*, *U. iranensis* [**35**, p. 440], which seems to be important, and *Ustilago hordei* on barley, *E. pisi* and *Peronospora aestivalis* [*P. trifoliorum*] on lucerne, *E. martii* on *Melilotus officinalis*, *Mycosphaerella morifolia* on white mulberry, *Uromyces polygoni-avicullariae*, *Marssonina castagnei*, and *Melampsora allii-populina* on poplars, *Puccinia plicata* and *Polystigma ochraceum* on almond, *Sphaerotheca pannosa* on peach, *Sterigmatocystis nigra* on pomegranate, *Venturia pirina* on pear, *Gloeodes pomigena* and *Leptothyrium pomi* on apple, *Phragmidium bayatii* and *Cercospora rosicola* on rose, *Uromyces flectens* on clover, *Septogloeum ulmi* and *Uncinula clandestina* on elm, *U. necator* on vine, and *Sclerospora graminicola* on *Setaria glauca*.

Moroshkovskiĭ (S. F.). Матеріали до мікофлори заповідника Михайлівська цілина. [Materials for the mycoflora of the Mikhaylovka virgin steppe reserve.]—Укр. Бот. Журн. [*J. Bot. Acad. Sci. Ukr.*], **15**, 3, pp. 74–82, 1958. [Russian and English summaries.]

A study in 1953–4 in the Lebedyan district, Sumy region, U.S.S.R., with additional

data from 1952 and 1956–7, during which 103 spp. and 12 forms were collected, mostly on wild plants.

Guyot (L.), Malençon (G.), & Massenot (H.). **Deuxième contribution à l'étude des Ustilaginales parasites du bassin méditerranéen occidental (Afrique du Nord et Péninsule ibérique).** [A second contribution to the study of the parasitic Ustilaginales of the western Mediterranean basin (N. Africa and the Iberian Peninsula).]—*Rev. Path. vég.*, **37**, 2, pp. 187–196, 1 pl., 1958.

These further notes [cf. **36**, p. 555] include *Tilletia caries* on *Aegilops ovata* in Algeria, *Tuburcinia* [*Urocystis*] *magica* [loc. cit.] on a leaf of *Allium nigrum* in southern Spain, *T.* [*U.*] *tritici* on *Triticum* sp. in Spain (between Madrid and Granada), and *Ustilago hordei* on barley in S. Algeria.

Melik-Khachatryan (D. G.). Материалы к изучению рода **Phyllosticta** в пределах северной Армении. [Data from the study of the genus *Phyllosticta* in north Armenia.]—Изв. биол. сел.-хоз. Наук [*Izv. biol. agric. Sci., Acad. Sci. Armen. S.S.R.*], **11**, 10, pp. 61–71, 1958.

In this study by the Botanical Section, Yerevan University, 46 *Phyllosticta* spp. were recorded, 25 being new for Armenia. *P. piricola* and *P. pirina* (1st record for Armenia) were found on pear, *P. prunicola* on sour cherry, *P. variabilis* (1st record) on raspberry, *P. grossularia* (1st record) on gooseberry, *P. betae* on beet, *P. caricae* and *P. sycophila* (1st record) on fig, and *P. morifolia* on white mulberry trees. All are prevalent, as the climatic conditions are favourable.

Barnett (H. L.). **A new Calcarisporium parasitic on other fungi.**—*Mycologia*, **50**, 4, pp. 497–500, 10 fig., 1958.

A pure white, imperfect fungus found during the routine culturing of oak twigs at W. Virginia University, Morgantown, in 1954, was growing over the dark mycelium of *Dothiorella quercina* [cf. **13**, p. 337; **21**, p. 272], on which it appeared to be parasitic; it is named *C. parasiticum* Barnett. It was also parasitic on the mycelium of certain species of *Physalospora*, including *P. obtusa*, *Botryosphaeria*, and *Coniothyrium* in agar cultures.

Buddenhagen (I. W.). **Natural and induced variability in Phytophthora cactorum (L. & C.) Schroet. and Phytophthora cinnamomi Rands.**—*Diss. Abstr.*, **18**, 2, p. 373, 1958.

Some of the mutants of *P. cinnamomi* induced by 4,000 r. X-ray of zoospores produced small, scarcely zonate colonies; typical hyphal swellings were absent from 2 mutants; 8 were pathogenic to apple fruits and retained their mutant phenotype after their recovery from the fruit. The mutants induced in *P. cactorum* have been described [**37**, p. 650].

Matturi (S. T.) & Stenton (H.). **A technique for the investigation of the competitive saprophytic ability of soil fungi by the use of easily decomposed substrates.**—*Nature, Lond.*, **182**, 4644, pp. 1248–1249, 1958.

Soft tissues are in general unsuitable for use in tests to compare the ability of saprophytes to invade from soil, because after rotting they are too weak to be thoroughly cleansed of adherent soil. In the technique here described from the Botany Dept., University of Hull, designed to avoid all unnecessary contact with the soil, pieces of washed, surface-sterilized rhizome of *Convolvulus sepium* served as the substrate, being inserted into 1¼-in. lengths of glass tubing and trimmed so that approx. ⅛ in. of tissue protruded at each end. After sterilization in propylene oxide vapour for 44 hr. they were exposed to various soil/inoculum mixtures, removed and trimmed of their protruding ends, washed under a strong jet of water,

and finally removed from the tubes, washed, surface-sterilized, and plated on potato dextrose agar. This technique proved adequate to distinguish between the competitive saprophytic abilities of several *Cylindrocarpon* spp. *Fusarium culmorum*, known to exhibit marked competitive ability, was also studied for purposes of comparison.

By cutting the substrate into sections and plating in sequence the rate of growth through the substrate may be determined.

Curl (E. A.). **Chemical exclusion of mites from laboratory fungal cultures.**—*Plant Dis. Reptr*, **42**, 9, pp. 1026–1029, 1958.

At the Alabama Polytechnic Institute, Auburn, sprays of 3–3·5% kelthane EC (1,1-bis(chlorophenyl)-2,2,2-trichloroethanol, Rohm & Haas, Philadelphia, Pennsylvania) applied to laboratory tables and shelves twice monthly and to the isolation-incubation room weekly have eliminated mite infestation [cf. **26**, p. 310].

Nixon (H. L.) & Fisher (H. L.). **An improved spray droplet technique for quantitative electron microscopy.**—*Brit. J. appl. Phys.*, **9**, pp. 66, 68–70, 4 fig., 1958.

The spray droplet technique of Backus & Williams (*J. appl. Phys.*, **21**, p. 11, 1950), improved by the incorporation of a cascade impactor, is described from Rothamsted Experimental Station. The decrease of droplet size makes it possible to use much higher magnifications without sacrificing the ability to photograph each droplet trace entire on one frame. The technique is useful for studying the state of aggregation of a suspension.

Chessin (M.). **Light quality and photoreactivation of plants and viruses.**—*Ann. appl. Biol.*, **46**, 3, pp. 388–392, 1 pl., 1958.

At Rothamsted Experimental Station the author tested visible light of different spectral regions for its ability to reverse 3 effects of ultra-violet radiation, viz. glazing of the leaves of French beans (*Phaseolus vulgaris*), increased resistance of French bean leaves to the Rothamsted tobacco necrosis virus, and inactivation of potato virus X [**35**, p. 272]. All 3 effects were reversed only by wave-lengths shorter than 4700 A.

Köhler (E.). **Über das Verhalten einiger Mosaikviren im geimpften Blatt im Anschluß an die Impfung.** [On the behaviour of some mosaic viruses in the inoculated leaf in relation to the inoculation.]—*Arch. Mikrobiol.*, **27**, 3, pp. 320–336, 14 graphs, 1957.

In further experiments [**36**, p. 750] at the Biologischen Bundesanstalt für Land- und Forstwirtschaft, Brunswick, Germany, in which tobacco mosaic virus (TMV), tobacco para mosaic [? str. of tobacco green mosaic] virus, several strains of potato virus X, and tobacco necrosis virus were inoculated by abrasion into the upper leaf surface of various hosts, a regular pattern of behaviour was observed in all. The introduced virus succumbs largely to gradual inactivation, only a relatively small part causing infection. The latent period is determined partly by temp. and largely by the individual host–virus combination. The shortest periods, 2·4 hr., were obtained with TMV in White Burley and potato virus X in Samsun tobacco, while the longest were 51 hr. for TMV and 40 hr. for virus X, both in Samsun. Multiplication in the lesions always followed an exponential course in the first few days except, e.g. TMV in *Nicotiana glutinosa*, where an early inactivating counter reaction of the host occurred. The rate of multiplication also varies but not to the same extent as the latent period. The exceptionally high multiplication rate of tobacco necrosis virus in bean (*Phaseolus vulgaris*) observed by Harrison [**36**, p. 171] may be attributable to the smallness of the particles, there being nothing notable in the latent period.

Serological tests in the incipient stage indicated no latent period, which leads to the conclusion that the synthesis of the virus antigen begins immediately after inoculation, but this needs verification by further experiments.

Schwarz (R.). **Untersuchungen über ein blattlausübertragbares, von Tabakfangpflanzen isoliertes Virus.** [Studies on an aphid transmissible virus isolated from trap plants of Tobacco.]—*Phytopath. Z.*, **33**, 4, pp. 375–384, 5 fig., 1958. [English summary.]

At the Institut für gärtnerische Virusforschung, Berlin-Dahlem, in 1956 a virus of unknown origin was found 3 times in Samsun tobacco plants used for trapping in the field. On the basis of the symptoms produced on 19 different test plants it is classed in the lucerne mosaic group [**36**, p. 408]. *Myzodes* [*Myzus*] *persicae* transmitted the virus from *Chenopodium quinoa* to Ackersegen potato and to young healthy *C. quinoa* plants. Deviations from the isolates of lucerne mosaic virus so far described were observed in the symptoms on tobacco (primary necroses, mosaic type clearings, and wavy bandings [**36**, p. 748] did not occur); on field bean (*Phaseolus vulgaris*), on which only local lesions developed; and on *C. quinoa* (systemic infection). Ageing time *in vitro* was between 24 and 30 days. These differences were not so pronounced, however, as to leave any doubt that the virus belongs to the lucerne mosaic group.

Valenta (V. M.). Новые данные о вирусах столбура и некоторых желтух в Чехословакия. [New data on the stolbur virus and some yellows in Czechoslovakia.]—*Trud. Inst. genet. Leningr.*, *1958*, 24, pp. 278–287, 5 fig., 1958.

At the Institute of Virology, Czechoslovak Academy of Sciences, Bratislava, observations on the distribution of [tomato] stolbur virus showed it to be present in all provinces of the country [**38**, p. 74]. *Hyalesthes obsoletus*, which does not exist in Slovakia, is not the only vector.

By mechanical and [unspecified] vector transmission 14 plant spp. were successfully infected, including tomato, potato, *Solanum nigrum*, eggplant, tobacco, *Nicotiana glutinosa*, *N. rustica*, *Datura stramonium*, *D. metel*, *Hyoscyamus niger*, and *Schizanthus pinnatus*. *N. glauca* proved to be a symptomless carrier. Simultaneous infection by stolbur and [potato] witches' broom [virus: cf. **36**, p. 781] in potatoes was observed in all districts and the relationship of the two is being investigated. Several strains of witches' broom virus, isolated from potato and transmitted to tomato, were also transmitted to the above-mentioned Solanaceae, in each case by means of *Cuscuta campestris* [see below]. Celery and clover were infected by stolbur but not by witches' broom.

The different forms of yellows in Slovakia have not yet been identified, but it is suggested that the tomato stolbur and potato witches' broom viruses may be responsible for them.

Valenta (V. [M.]). **A new yellows virus causing flower proliferations in the Dodder, Cuscuta campestris Yunck.**—*Phytopath. Z.*, **33**, 3, pp. 316–318, 1 fig., 1958.

Tests at the Institute of Virology, Czechoslovak Academy of Sciences, Bratislava, showed that a strain of yellows-type virus (labelled stolbur) isolated some years previously from tomato plants with stolbur (big bud) symptoms in the Crimea (U.S.S.R.) could not be identified with any yellows-type virus yet described. This virus, several strains of typical tomato stolbur virus [**37**, p. 764 and above] differing in severity, and 3 types of potato witches' broom virus occurring in Czechoslovakia [**36**, p. 781] were tested by transmission through dodder, which proved to be the most suitable host for differential diagnosis. A typical yellows disease developed in *C. campestris* which had been grown on plants infected by the Crimean yellows virus. In the eggplant var. Crimean 7/14, which reacts to stolbur with enlargement

of the calyx, the Crimean virus did not induce any floral malformation, nor did it in 4 other eggplant vars. in which the stolbur virus induced wilting without flower symptoms. The potato witches' broom strains produced in all 5 eggplant vars. very pronounced phyllody of the calyx and reduction and virescence of the corolla.

In potatoes the Crimean virus behaved in some respects like the potato witches' broom viruses. It produced no sign of the purple-top wilt syndrome typical of stolbur and was tuber-perpetuated. In clovers and *Vinca rosea* [loc. cit.] the Crimean virus caused flower phyllody, thus showing a certain resemblance to the clover phyllody and stolbur viruses. In *V. rosea* infected with the Crimea virus and grafted with *V. rosea* infected with clover phyllody there was no interference between the two viruses.

Schmelzer (K.) & Rondomański (W.). **Zur Ätiologie des Mohnmosaiks.** [On the etiology of Poppy mosaic.]—*Phytopath. Z.*, **33**, 4, pp. 426–429, 1 fig., 1958.

As a result of experiments at the Institut für Phytopathologie, Aschersleben, Germany, the authors concluded that the mosaic on opium poppy described by Heinze [**31**, p. 370] is in fact caused by beet mosaic virus, as indicated by the symptoms produced by inoculation into beet and several other plants.

De Tempe (J.). **Three years of field experiments on seed-borne diseases and seed treatment of cereals.**—*Proc. int. Seed Test. Ass.*, **23**, 1, pp. 38–67, 2 fig., 12 graphs, 1958.

Information already noticed [**37**, p. 714].

Hansen (L. R.) & Aastveit (K.). **Fôrgrødeforsøk på fotsykesmittet jord.** [Crop rotation experiments on foot rot-infected soil.]—Reprinted from *Samvirke, 1958*, 5, 4 pp., 2 fig., 1958.

The results of earlier experiments included here have been noticed [**36**, p. 520]. Barley and wheat roots in eastern Norway were attacked in 1957 principally by take-all [*Ophiobolus graminis*], though oats again remained free from this disease and eyespot [*Cercosporella herpotrichoides*]. The suitability of oats as a forerunner, or oats where couch grass [*Agropyron repens*] is abundant, is confirmed, while an intersowing of clover with an early 6-rowed barley var. may be advantageous on sandy soil. The cultivation of wheat on soil infested by *O. graminis* should be discontinued as uneconomic.

Whitehead (M. D.). **Pathology and pathological histology of downy mildew, Sclerophthora macrospora, on six graminicolous hosts.**—*Phytopathology*, **48**, 9, pp. 485–493, 17 fig., 1958. [21 ref.]

At Missouri Agricultural Experiment Station, Columbia, oospores of *S.* [*Sclerospora*] *macrospora* were found in the tissues of a proliferated head of Texas Blackhull Kafir sorghum, saved from a field at Amherst, Texas, where spikelet abnormalities had been described in 1936 (*Heredity*, **27**, pp. 183–194). This appears to be a new host record [cf. **35**, p. 528; **37**, p. 308]. Detailed examination of deformed maize inflorescenes showed the intercellular spaces round the vascular sheath cells, particularly in secondary vascular bundles, to be the primary centres of mycelial development, the hyphae enlarging to form globular, protoplasmic masses, sometimes with thickened walls. Oospores were formed in association with vascular bundles, the closely appressed xylem cells becoming enlarged and distorted, with abnormally pronounced spiral thickening. Irregular thickening of leaf sheath and husk tissues (to double the normal) caused a warty appearance. Up to 15 sporangiophores could penetrate through 1 stomata, on either leaf surface. Less extensive studies indicated a similar host–parasite relationship in sorghum, wheat, oats, barley, and *Digitaria sanguinalis*.

Cherewick (W. J.). **Cereal smut races and their variability.**—*Canad. J. Pl. Sci.*, **38**, 4, pp. 481–489, 1958. [26 ref.]

Pathogenicity tests on 2,880 collections and selected subcultures of cereal smuts [**30**, p. 407] at the Canada Dept Agric., Winnipeg, Manitoba, indicated that generally a single collection consisted of mixed or heterogenous strains. The passage of variable cultures through selected hosts occasionally resulted in a stable strain (a race), but more often cultures remained variable even in the 10th generation of selection. Covered smut of oats (*Ustilago kolleri* [*U. hordei*]) was the least variable and covered smut of barley (*U. hordei*), loose smut of oats (*U. avenae*), and barley false loose smut (*U. nuda*) progressively more variable. No stable strain has been isolated from loose smut of wheat (*U. tritici* [*U. nuda*]) or barley: selfing some variable cultures indicate the possibility of producing races stable for pathogenicity on differential hosts.

Sharp (E. L.), Schmitt (C. G.), Staley (J. M.), & Kingsolver (C. H.). **Some critical factors involved in establishment of Puccinia graminis var. tritici.**—*Phytopathology*, **48**, 9, pp. 469–474, 5 graphs, 1958.

At Fort Detrick, Frederick, Maryland, Baart wheat seedlings were inoculated in a settling tower with uredospores of races 56 and 17 of *P.g.* f.sp. *tritici*, placed in a dew chamber at various temps., and then in the greenhouse. Germination proceeded well over the range 60–75° F. [cf. **36**, p. 390; **37**, p. 273] and a 2-hr. dew period was almost as effective as a longer one; germination was also good under light of 0–300 ft.-c., was decreased above this, and prevented by 1,000 ft.-c. Appressoria formed equally well from 60 to 80°, were first noted after a 2-hr. dew period, and after 8 hr. had developed from 50% of the germinated spores. Min., opt., and max. temps. for penetration of the leaf were 60°, 85°, and 95°, and light had a pronounced effect; 10 times as many substomatal vesicles formed on leaves exposed to full sunlight before inoculation as on shaded ones. Of over 1,000 appressoria counted, 5·5% formed vesicles and some 67% as many pustules were developed as vesicles.

With 10-hr. dew a continuous temp. of 75° was opt. for infection, which increased with the length of the dew period above a min. of 4–5 hr. In inoculated plants given 9 hr. dew at 60° and then 1 hr. at temps. up to 95°, 85° was the best for post-appressorial development giving 8 times as many pustules as 10 hr. dew at 60°. When 16 hr. dew at 60° in the dark was followed by 2 hr. dew at 80° with 500 ft.-c. or more infection was max. on the adaxial leaf surface, only 59% of this developing when darkness was maintained throughout; inoculation of the abaxial surface gave 77% of the max. after exposure to light and only 11% in continuous dark. Light of 5,000 ft.-c. was no more effective than 500; less than 500 was no better than darkness. Min. temp. for leaf penetration in light was 50°.

An empirical formula for estimation of field infection is: Infection (penetration) units = $(T-50) \times D \times C$ where T = temp., D = hr. dew in light of at least 500 ft.-c., and C a correction factor (tabulated), correlating dew duration and appressorial formation. In field inoculations 1 infection unit gave approx. 3 pustules/culm. It is apparent that the opt. conditions for the 2 phases of infection, prepenetration and penetration, differ considerably.

Wilcoxson (R. D.). **Peduncle sclerenchyma tissue of Nugget Wheat in relation to development of pustules of Puccinia graminis var. tritici.**—*Phytopathology*, **48**, 9, pp. 518–519, 1 fig., 1958.

Studies at the University of Minnesota, St. Paul, indicated that the rapid formation of numerous, large uredosori on the peduncles of Nugget wheat, very susceptible to race 15B of *P. graminis* f.sp. *tritici* [**36**, p. 687], was attributable to the abundance of intercellular spaces in the sclerenchyma [cf. **11**, p. 562].

Watson (I. A.) & Luig (N. H.). **Timvera—a Steinwedel × Triticum timopheevi derivative.**—*Agron. J.*, **50**, 10, p. 644, 1958.

It has been demonstrated that wheat var. Lee could replace Gabo for differentiation of races of *Puccinia graminis* f.sp. *tritici* [**38**, p. 76] in the Australia–New Zealand area. Timvera, carried in Sydney University Accessions as W 1308, and the Wisconsin line C.I. 12632 were resistant to race 21 Anz 2 [**36**, p. 179], and their F_2 reactions indicated that the mode of inheritance of resistance in each was controlled by a similar or identical genetical system. Adult plant reactions of Timvera, W 1309, W 1310 (2 sibs of Timvera), and C.I. 12632 to *P. rubigo-vera tritici* [*P. triticina*: **37**, p. 346] were similar, but seedling reaction of C.I. 12632, which carries the Chinese factor for leaf rust resistance, was quite unlike the other 3: Timvera, which inherited its resistance from *T. timopheevi*, was resistant throughout life. Consistent lack of a single factor for resistance in the plants studied indicates a complex inheritance pattern.

Shopina (Mme V. V.). Роль предшественников в изменении поражаемости Пшеницы бурой ржавчиной. [The role of preceding crops in altering the damage to Wheat by brown rust.]—*Proc. Lenin Acad. agric. Sci.*, *1957*, 9, pp. 34–36, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 12, p. 199, 1958.]

In the Krasnodar region, U.S.S.R., Novoukrainska 83 wheat was heavily infected by brown rust [*Puccinia triticina*: **36**, p. 481] in fields previously sown with cotton or left as bare fallow, but was not so in fields previously sown with maize or sunflower. In the first instance the soil had a high nitrate content and the leaves high N, whereas in the second K was predominant in both, indicating its role in resistance.

Jaff (A. H.). **Inheritance of resistance to physiologic races T-8, T-16, and T-17, of Tilletia caries (DC.) Tul. in hybrids of (27–15 × Rio-Rex)-Selection 53 and Elgin Wheat.**—*Diss. Abstr.*, **18**, 2, pp. 369–370, 1958.

At the Pendleton Branch Experiment Station, Oregon, the F_1 and F_2 from Sel. 53 (of 27–15 × Rio-Rex) × Elgin wheat (crossed in 1953) were protected against *T. caries* [**37**, p. 767] in 1954 and 1955. The F_2 seed was inoculated in autumn 1955 with race T-8, T-16, or T-17 of *T. caries*, applied in 5% methocel. It appeared that resistance to T-8 was conditioned by 2 linked major genes, one dominant (either the Turkey or the Rio gene) and the recessive Ridit gene; inheritance of resistance to T-16 and T-17 was conditioned by 2 major genes, Martin 1 and Ridit, and 1 or 2 modifiers with different levels of susceptibility in each race (all these, except Ridit, being different from those conditioning resistance to T-8); thus Sel. 53 has at least 3 major genes for resistance to bunt, plus 1 or more modifiers.

Sevryukova (Mme L. S.). О применении десорбционногазового метода дезинфекции по борьбе с твердой головней Пшеницы. [On the application of a desorption-gas method for disinfection in the control of Wheat bunt.]—*J. Kharkov. agric. Inst.*, **13**, 50, pp. 149–154, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 10, p. 197, 1958.]

In laboratory and field tests the treatment of wheat seed infected by bunt [*Tilletia caries*: **36**, pp. 460, 462] for 24 hr. with 5% furfural sorbent at 2% conc. or 10% at 1% decreased infection and increased germination twice. Formaldehyde and formic acid used in the same way decreased it 2–2½ times.

Kozyreva (Mme G. A.). Корневые гнили яровой Пшеницы в засушливых районах освоения целинных и залежных земель и агробиологическое обоснование мероприятий в борьбе с ними. [Root rot of spring Wheat in the arid areas of reclamation of virgin and neglected land and control measures

based on agrobiology.]—*Trud. vsesoyuz. Inst. Zashch. Rast.*, **11**, pp. 102–126, 1958.

Field experiments since 1954 by the Agrotechnical Laboratory for Plant Protection in the Akmolinsk region, Kazakh. S.S.R. have shown that the main facultative hosts and sources of infection of root rot (*Helminthosporium sativum*) [*Cochliobolus sativus*: **37**, p. 345] are wild oat [*Avena fatua*] and quack grass [*Agropyron repens*]. The causes of severe infection of wheat in virgin and neglected areas, sown for the 1st time, were the irregular soil humidity and P deficiency. Application of 'phosphorobacterin' to the seed increased resistance. Between 29 Apr. and 10 May is the most favourable period for sowing spring wheat, and deep ploughing (25–27 cm.) is recommended.

Powers (H. R.). **Histological evaluation of the effect of anisomycin on Erysiphe graminis f.sp. tritici.**—*Phytopathology*, **48**, 9, pp. 474–477, 2 fig., 1958.

At Beltsville anisomycin [cf. **37**, p. 128], sprayed at 300 p.p.m. on Little Club wheat seedlings previously inoculated with *E. graminis* and held at 68° F. in a moist chamber, proved an effective eradicant even when applied 7 days after inoculation. The hyphae became necrotic within 2 hr., though the haustoria remained apparently unaffected. But whereas griseofulvin at 50 and 100 p.p.m. via the roots gave excellent systemic control, anisomycin applied similarly was not translocated and gave no protection to plants inoculated 24 hr. after treatment; higher concs. were phytotoxic. The coverage obtained with anisomycin in the greenhouse might be difficult to achieve under field conditions.

Bockmann (H.). **Untersuchungen über die Braunfleckigkeit des Weizens im Sommer 1957.** [Studies on brown spot of Wheat in the summer of 1957.]—*Phytopath. Z.*, **33**, 3, pp. 225–240, 5 fig., 1958. [English summary.]

A new method of assessing the degree of infection of wheat by *Septoria nodorum* [**37**, p. 32] is to submerge infected ears in water for 2–3 hr. and estimate the quantity of spores collecting on the surface. Used at the Biologische Bundesanstalt, Kiel-Kitzeberg, Germany, this method had the advantage that late infections on wheat ears, when the symptoms are not so clearly expressed, and also the degree of infection on brown-eared vars. could be judged more easily and clearly. It was thus established that *S. nodorum* increases with delay in sowing time; short plants are attacked more strongly than tall; and the formation of many late tillers is particularly unfavourable. Conditions that favour infection generally lead to a delay in ripening also.

The fungus seems to have little influence on the actual process of ripening, though it may make it more premature. Reduction in yield is difficult to estimate owing to the conjunction of the disease with various unfavourable growth factors and must await infection experiments.

Evidence was apparent of a differential varietal resistance, which must also be elucidated by inoculation.

Miyamoto (Y.). **Studies on soil-borne cereal mosaics. II. On the Barley yellow mosaic virus. (Part I).**—*Ann. phytopath. Soc. Japan*, **23**, 2, pp. 69–75, 1958. [Japanese. Abs. from English summary.]

Barley yellow mosaic virus, widespread in Japan, infects susceptible barley vars. through the soil in winter but not wheat or rye; at Hyogo University of Agriculture it was transmitted to barley by rubbing with infective sap but not by insects, nor was it seed-borne. Rising temp. or addition of chemical fertilizer reduced expression of symptoms, which resembled the mottle produced by wheat yellow mosaic virus on wheat. The greatest depth at which infested soil could cause the disease was 15 cm. below the seeds; 10 min. exposure to 50–60° C. inactivated the virus in the

soil. Rate of infection was increased 2–3 times by pregerminating the seeds, so that 2 or 3 roots had developed when they were sown in infested soil.

Schein (R. D.). **Pathogenic specialization in Rhynchosporium secalis.**—*Phytopathology*, **48**, 9, pp. 477–480, 1958.

At Pennsylvania State University, University Park, inoculation of the differential barley vars. Wong (C.I. 6728), Wisconsin Winter × Glabron (C.I. 8162), Brier (C.I. 7157), California 1311, Hudson, Atlas 46 (C.I. 7323), and La Mesita (C.I. 7565) with 9 isolates of *R. secalis* from 6 States of the U.S.A. resulted in the distinction, indicated by a key, of 7 strains [cf. **28**, p. 60; **37**, p. 715]. In addition, 94 grass spp. of 40 genera were inoculated with some of the isolates, 1 of which (from barley in California) infected 5 spp. of *Agropyron*, *Bromus arvensis*, and *Festuca idahoensis* [cf. Sprague: **30**, p. 420; **37**, p. 655].

Buchli (M.). **Die Sommergerste Ceresia.** [The summer Barley Ceresia.]—*Mitt. schweiz. Landw.*, **5**, 6, p. 116, 1957.

Following field tests over several years Ceresia has been provisionally incorporated into the official Swiss standard barley assortment. It possesses good resistance to mildew [*Erysiphe graminis*: **36**, p. 376].

Campbell (W. P.). **Infection of Barley by Claviceps purpurea.**—*Canad. J. Bot.*, **36**, 5, pp. 615–619, 1 pl. (10 fig.), 14 fig., 1958.

It was observed at the Plant Pathology Laboratory, Edmonton, Alberta, that penetration of the ovary of Newal barley (*Hordeum vulgare*) by *C. purpurea* [**34**, p. 225] took place within 24 hr. near the base of the ovule, mycelium spreading intercellularly within the ovary wall; within 4–5 days the fungus moved intracellularly into the ovule, simultaneously growing out to the ovary surface to form a hymenium, on which spores and honeydew were produced within 5 days of infection. Stylar and stigmatic tissues, which were never invaded initially, were pushed up to form a cap on the maturing sclerotium.

Green (G. J.). **Pathogenicity of two new races of Oat stem rust.**—*Plant Dis. Reptr*, **42**, 9, pp. 1080–1083, 1 graph, 1958.

Races 8A and 13A of *Puccinia graminis* [**38**, p. 79], isolated from oats at Ste. Anne de la Pocatière, Quebec, in 1957, differ from 8 and 13 in attacking Rodney and Garry. At the Canada Dept of Agric. Research Laboratory, Winnipeg, Manitoba, 8A was avirulent on seedlings and adult plants with the White Russian type resistance; 13A attacked all inoculated vars. except those with resistance derived from Jostrain, which, however, tended to become susceptible at high temps. The best seedling resistance to these 4 races and to 7 and 7A was found in *Avena strigosa* and some of its derivatives.

Goth (R. W.), Rowell (J. B.), & Kernkamp (M. F.). **Behaviour of solopathogens from interspecific crosses of some Sphacelotheca spp.**—*Phytopathology*, **48**, 9, pp. 494–497, 1 fig., 1958.

At the University of Minnesota, St. Paul, monosporidial isolates that were pathogenic to maize and produced sori with viable chlamydospores, i.e. solopathogenic [cf. **11**, p. 363], occurred among the progeny from crosses of *S. sorghi* or *S. cruenta* with *S. reiliana* [cf. **14**, p. 504; **24**, p. 14]. The chlamydospores germinated abnormally, with much lysis; the F_2 sporidia were for the most part also solopathogenic. Mating tests with the original parents demonstrated segregation of parental characters for pathogenic and sexual compatibility. Apparent segregation and recombination of parental characters for cell type and pigmentation was also observed. Alpha irradiation of sporidia of the original solopathogenic lines induced

similar segregation. In general, behaviour resembled that of solopathogenic lines of *Ustilago maydis* [cf. **37**, p. 533].

Vago (C.). **Virulence cryptogamique simultanée vis-à-vis d'un végetal et d'un insecte.** [Simultaneous cryptogamic virulence towards a plant and an insect.] —*C.R. Acad. Sci., Paris*, **247**, 19, pp. 1651–1653, 1958.

From the Laboratoire de Cytopathologie, Alès [Sardinia], the author describes a case of joint infection by *Gibberella fujikuroi* of maize stems and ears and the larvae of *Pyrausta nubilalis* infesting them. The insects were partially immobilized and bore numerous black patches; the mycelium involved the haemolymph and adipose tissue. Inoculation of maize plants by Messiaen & Lafon's method [**37**, p. 160] resulted in 70% infection between the ears and the spathes and less than 5% on the stems and exposed surfaces of the ears. The subcutaneous injection of culture suspensions into the larvae led to generalized mycosis and phagocytosis in 15–17 days.

Miczyńska (Zofia). **Fuzariozy Kukurudzy.** [Fusariosis of Maize.]—*Postęp. nauk. roln.*, **4**, 1, pp. 111–118, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 12, p. 200, 1958.]

A report from the Puławy Institute for Plant Protection on infection of maize in Poland by *Fusarium poae*, *F. graminearum*, and *F. culmorum*. Symptoms and damage are described.

Sabet (K. A.). **On the effect of certain environmental conditions on infection with the bacterial root- and stalk-rot disease of Maize.**—*Indian J. agric. Sci.*, **27** (*1957*), 4, pp. 467–474, 4 graphs, 1958. [Received Dec. 1958.]

At the University of Cairo, Egypt, it was found that 35° C. and 70% moisture were about opt. for infection (by soil inoculation) of maize seedlings by *Erwinia carotovora* f.sp. *zeae* [**36**, p. 523] in a light loam soil. In lighter soils infection took place at a lower temp. and higher moisture than in heavier soils; neutral or slightly alkaline soil was more favourable than acid. Saturating infested soil with water for 5–10 days checked subsequent infection. The disease is thus favoured by high atmospheric temp. and humidity. High humidity for 4 days rendered the relatively resistant maize vars. K 64 and American Early as susceptible as K 55 and G 102. Increasing susceptibility during the 'Nile' growing season (July–Oct.) is attributed to the rising humidity.

Zhukova (Mme K. P.). Заболевание семян Кукурузы 'голубой глаз'. ['Blue eye' disease of Maize grain.]—*Zashch. Rast., Moscow* [*Plant Prot., Moscow*], *1957*, 3, p. 28, 1957.

The extremely poor germination (10–20%) in maize fields in the Serebryano-Prudski region, near Moscow, in spring 1956 was determined by the Station for Plant Protection, Moscow, to be due to grain infection by 'blue eye'. The condition is very often practically unnoticeable, being a pale blue or greenish patch near the embryo. Infection increases greatly during storage if the grain is not properly dried, the store is damp, and ventilation inadequate. In advanced infection the seeds swell and in a few days are covered with bluish spores. All isolations yielded *Penicillium cyclopium* or *P. chrysogenum* or both [cf. **21**, p. 484].

The disease is very widespread, being reported from Georgia S.S.R. and the Krasnodar, Odessa, and Voronezh regions.

Lichtwardt (R. W.), Barron (G. L.), & Tiffany (Lois H.). **Mold flora associated with shelled Corn in Iowa.**—*Iowa St. Coll. J. Sci.*, **33**, 1, pp. 1–11, 14 fig., 1958.

The spp. found during a study of deterioration of shelled maize, started in autumn 1955, are listed with their frequency. Untreated grain and that surface-sterilized

with ethanol were examined for fungal growth in moist chambers and on Christensen's malt agar. The outward appearance of the grains did not give a reliable indication of the level of internal infection. By and large the moulds which grew on the surface of unsterilized grains were the same as those to be found within. A number of *Penicillium* and *Aspergillus* spp. were frequent or very frequent [cf. **38**, p. 80]; *Diplodia zeae* [*D. maydis*] and *Fusarium* sp. were sometimes very frequent in surface-sterilized grain.

Tokunaga (Y.) & Furuta (T.). **Studies on the blast disease of Rice in humus rich paddy field, with special reference to soil conditions. 1. Influence of the irrigation period before the transplanting of Rice seedlings upon the occurrence of blast disease. 2. Influence of the oxidation reduction potentials of soil upon the occurrence of Rice blast.**—*Bull. Tohoku agric. Exp. Sta.* 13, pp. 12–18, 2 graphs; pp. 19–25, 1958. [Japanese. Abs. from English summaries.]

Rice blast [*Piricularia oryzae*] accompanied by root rot seriously damaged seedlings transplanted too soon after irrigation in soil rich in humus, owing to the unstable oxidation-reduction potential of such soil. Seedlings crowded in the nursery bed were more influenced by such conditions, and sparse sowing is advised, with transplantation more than 3 days after irrigation.

The 2nd paper is concerned with the measurement of the oxidation-reduction potential after irrigation. No apparent connexion was observed between the effect of blast on rice plants and the reduction-oxidation potential of the soil.

Wakimoto (S.) & Yoshii (H.). **Relation between polyphenols contained in plants and phytopathogenic fungi. (1) Polyphenols contained in Rice plants.**—*Ann. phytopath. Soc. Japan*, **23**, 2, pp. 79–84, 1 fig., 1958. [Japanese. Abs. from English summary.]

At Kyushu University the polyphenol content of rice plants increased with growth, reaching a max. at tillering, and was higher in the leaves than in other parts. Vars. resistant to blast [*Piricularia oryzae*: **37**, p. 718] contained more polyphenols with red colour reaction to Arnow's reagent (*J. biol. Chem.*, **118**, pp. 531–537, 1937) than susceptible ones. Polyphenol content was increased by infection with *P. oryzae* or *Helminthosporium* [*Cochliobolus miyabeanus*] and decreased by N fertilizer.

Nonaka (F.), Iwata (T.), & Yoshii (H.). **Effect of silicic acid on the severity of Rice stem rot caused by Leptosphaeria salvinii Cat.**

Nonaka (F.) & Yoshii (H.). **Carbohydrate and nitrogen contents of the lower-parts of Rice culms affected with stem rot fungus (L. salvinii Cat.).**—*Sci. Bull. Fac. Agric. Kyushu*, **16**, 3, pp. 447–454; pp. 459–463, 1958. [Japanese. Abs. from English summaries.]

The addition of sodium silicate to culture solution (250–500 p.p.m.) or to the soil (500 p.p.m.) decreased the severity of rice stem rot [**37**, p. 719] and the soluble N content of the base of the culms, while the carbohydrate/soluble N ratio was increased.

The 2nd paper states that in affected plants the carbohydrate content of the culms is lowered and the N content is increased in proportion to the severity of the disease. In sterile straw cultures of *L. salvinii* carbohydrates decreased and N increased, both decreasing when the sclerotia were removed from the straw; these sclerotia contain less carbohydrate and more N than those from rotted culms.

Nour-Eldin (F.) & Bishay (F.). **Presence of the tristeza virus disease in Egypt.** —*F.A.O. Pl. Prot. Bull.*, **6**, 10, pp. 153–154, 1 fig., 1958.

Of 85 citrus trees introduced and selected at the Barrage Experiment Station, Egypt, examined in Oct. 1957 for symptoms of tristeza virus, 4 exhibited minute

bark pits [cf. **37**, p. 476] and honeycombing just below the bud union. Of these, 2 were bergamot budded on sour lime, one was a Tanarif sweet orange budded on sour orange, and one Valencia budded on sour orange. In Jan. 1958 young leaves of Mexican lime seedlings budded from the 4 suspected trees were displaying characteristic symptoms of tristeza, though no such symptoms were apparent on those budded from the apparently healthy trees; symptoms were very difficult to detect on a Beledy lime budded at the same time. It is believed that the disease has not been spread to any appreciable extent as the vector *Toxoptera citricidus* does not occur in Egypt, though *Aphis gossypii* does.

Trippi (V. S.) & Mesías (J. R.). **Algunas diferencias bioquímicas y fisiológicas entre plantas sanas y presumiblemente enfermas con 'tristeza en Citrus'.** [Some biochemical and physiological differences between healthy Citrus plants and those suspected of infection with 'tristeza'.]—*Rev. industr. agríc. Tucumán*, **41**, 2, pp. 29–32, 1 fig., 1957. [English summary. Received Dec. 1958.]

Plants in the citrus collection at the Estación Experimental Agrícola, Tucumán, Argentina, showing symptoms of infection by citrus tristeza virus [**36**, p. 317] contained less carbohydrate and N compounds than healthy ones as a result of their reduced chlorophyll and general decline in physiological activity. Respiration and the activity of catalase and amylase were less in affected plants, but there was a greater conc. of oxidases and peroxidases. The proportions of the chlorophyll pigments were closely related to the condition of the material analysed; while the quantity of chlorophyll was greater in healthy plants, carotene and xanthophyll were more abundant in the diseased.

Calavan (E. C.), Carpenter (J. B.), & Weathers (L. G.). **Observations on distribution of cachexia of Citrus in California and Arizona.**—*Plant Dis. Reptr*, **42**, 9, pp. 1054–1056, 1 fig., 1958.

In California symptoms of cachexia (or citrus xyloporosis virus [**38**, p. 4], though a connexion between the two has not yet been established locally) were first noticed in 1954 on Willow Leaf mandarin oranges at Indio; the disease is now widespread on Clementine mandarins in the Coachella and Imperial Valleys. In Arizona symptoms have been observed repeatedly since 1954 on Orlando, Sunshine, and Seminole tangelos in variety plantings.

Klotz (L. J.), DeWolfe (T. A.), & Wong (P.-P.). **Controlling Phytophthora root rot of Citrus.**—*Calif. Citrogr.*, **43**, 11, pp. 390–392, 1 fig., 1958.

A popular note on control measures already noticed [cf. **37**, pp. 165, 720].

Klotz (L. J.), DeWolfe (T. A.), & Wong (P.-P.). **Influence of 2 varieties of Citrus scions on the pathogenicity of 3 isolates of Phytophthora parasitica to Sweet Orange rootstock.**—*Phytopathology*, **48**, 9, pp. 520–521, 1958.

A series of wound inoculations with 3 isolates of *P. parasitica* [**37**, p. 235] were made in Aug.–Sept. 1957 at Riverside, California, on 30-yr.-old Madam Vinous sweet orange rootstocks carrying Lisbon lemon or Washington navel orange tops. The size of the cankers developed in a month indicated significant differences in pathogenicity between the isolates, susceptibility of the rootstock also being influenced by the scion (greater under Lisbon).

Erickson (L. C.), DeWolfe (T. A.), & Brannaman (B. L.). **Growth of some Citrus-fruit pathogens as affected by 2,4-D and 2,4,5-T.**—*Bot. Gaz.*, **120**, 1, pp. 31–36, 9 fig., 1 graph, 1958.

At the University of California Citrus Experiment Station, Riverside, 2,4-D (cf. J. Guiscafre-Arrillaga, *Phytopathology*, **39**, pp. 8–9, 1949) and 2,4,5-T [**37**, pp. 284,

477], both at 5×10^{-3} M (the highest conc. tested), significantly retarded but did not inhibit the growth of *Alternaria citri, Botrytis cinerea, Diaporthe citri, Diplodia natalensis, Oospora* [*Geotrichum candidum* var.] *citri-aurantii, Penicillium digitatum, Sclerotinia sclerotiorum,* or *Trichoderma lignorum* on potato dextrose agar plus 0·2% yeast extract. *P. italicum* was not affected. There was no stimulation of growth at the lower concs.

Florestando (H. J.) & Bahler (M. E.). **Experimental control of Citrus fruit decay with 1-piperidino-2-phenyl-3-butanone hydrochloride.**—*Appl. Microbiol.*, **5**, 5, pp. 303–305, 1957. [*Biol. Abstr.*, **32**, 11, p. 3228, 1958.]

At the Pitman-Moore Company, Indianapolis, Indiana, blue and green mould [*Penicillium italicum* and *P. digitatum*] and stem-end rot [*Diaporthe citri*] on oranges was controlled by an alcoholic spray containing this fungicide [cf. **34**, p. 384] at 0·5–5%; at 0·5% it was as effective as 8% aqueous borax.

Roistacher (C. N.), Klotz (L. J.), Kolbezen (M. J.), & Staggs (E. R.). **Some factors in the control of blue-green mold decay of Citrus fruit with ammonia.**—*Plant Dis. Reptr*, **42**, 10, pp. 1112–1122, 2 fig., 13 graphs, 1958. [18 ref.]

At the University of California Citrus Experiment Station, Riverside, an injection of ammonia gas into cartons of navel oranges 1 day after they had been wounded and showered with dry *Penicillium italicum* and *P. digitatum* spores was more effective against decay than injections on the 5th or 9th days [cf. **37**, p. 165]. The best control was given by 2 or 3 injections of $\frac{1}{2}$ or $\frac{3}{4}$ g. anhydrous gaseous ammonia/carton ($10 \times 11 \times 16\frac{1}{2}$ in.). Under simulated refrigerator car conditions decay control was proportional to the amount of ammonia released from dried chemicals [**36**, p. 315] in pellet form (Winning-Peplow Co., Los Angeles) or on paper sheets, which were analysed after various periods in the cartons.

Rodríguez (R. A.). **La 'mancha mantecosa', enfermedad por virus en el Cafeto.** [Blister spot, a virus disease of Coffee.]—*Suelo tico*, **10**, 39, pp. 94–97, 2 fig., 1958.

An increase in the incidence of blister spot of coffee [**36**, p. 760] is reported by the Departamento de Agronomía, Costa Rica. Outbreaks have occurred in such widely separated places as Meseta Central, Turrialba, San Pedro de Poás, Mercedes Norte de Puriscal, La Luisa de Valverde Vega, Naranjo, and Santiago de Palmares. The Phytopathological Section of the Ministry of Agriculture, which is carrying out a survey throughout the country, reports that the progress of the disease in a plot of 501 plants was 49 diseased plants in Mar., June 73, and Oct. 112.

Rodríguez (R. A.), Bianchini (C. L.), & Soto (C. A.). **Arseniato de plomo como fungicida en el combate de 'derrite' en el Café.** [Lead arsenate as a fungicide for the control of 'derrite' on Coffee.]—*Suelo tico*, **10**, 39, pp. 89–93, 1 graph, 1958.

In field tests by the Departamento de Agronomía, San José, Costa Rica, 4–5-yr. old coffee plantations suffering from a severe attack of 'derrite' (*Phyllosticta coffeicola*) [**37**, p. 42] and 'quema' (*Phoma costarricensis*) [**37**, p. 661] were sprayed with 6 fungicides 3 times at 3-week intervals. Only nu rex (a lead arsenate formulation at 3 lb./100 gal.) gave highly satisfactory results, preventing leaf infection and being as successful as orthocide 50 in protecting plants from secondary infection of the tender buds and shoots.

Razafindramamba (R.). **Biologie de la rouille du Caféier.** [The biology of Coffee rust.]—*Rev. Mycol., Paris*, **23**, 2, pp. 171–200, 1958. [100 ref.]

An account is given of the present state of knowledge concerning coffee rust, caused

by *Hemileia vastatrix* [cf. **37**, p. 354 *et passim*] and *H. coffeicola* [cf. **37**, p. 536], the history of the disease, its geographical distribution, symptoms, the morphological differences between the 2 causal agents, the cycle of reproduction of *H. vastatrix*, the virulence of its different races, genetic variations in the host, the influence of the host and of environmental factors upon the development of the disease, and control by the use of resistant vars. and the application of fungicides.

Mayne (W. W.). **Blights and beverages in S. India and Ceylon.**—*Indian Coffee*, **22**, 1, pp. 7–12, 1958.

A review of the history of coffee leaf disease (*Hemileia vastatrix*) and tea blister blight (*Exobasidium vexans*).

Kalyanasundaram (R.) & Braun (R.). **Über die Probleme der Baumwollwelke.** [On the problems of Cotton wilt.]—*Phytopath. Z.*, **33**, 4, pp. 321–340, 12 fig., 6 graphs, 1958. [English summary. 43 ref.]

The most important results of investigations in India during the last 10 yr. on the cotton wilt caused by *Fusarium oxysporum* f. *vasinfectum* [**35**, p. 386; **36**, p. 469 *et passim*] are reviewed.

Bhide (V. P.), Desai (M. K.), & Rane (M. S.). **Control of seedborne infection of anthracnose of Cotton in Bombay State.**—*Indian Cott. Gr. Rev.*, **11**, 4, pp. 496–498, 1957.

Cotton anthracnose (*Colletotrichum indicum*) [cf. **13**, p. 507] has become a limiting factor in the cultivation of Virnar cotton in the Khandesh districts of Bombay State, where it first became serious in 1953.

When disease-free Virnar seed was heavily inoculated with a spore suspension in greenhouse experiments at the Plant Pathological Laboratory, College of Agriculture, Poona, the disease progressed rapidly, killing 70% of the seedlings in 2 weeks. Two organic mercurials (1% active) gave better control (1–2% incidence) than 2 Cu compounds (11 and 20%). In subsequent field trials in the Nasik district, 1956–7, incidence after seed treatment with organic Hg was 3·8%, compared with 12·7% in the untreated; in 2 Khandesh districts the corresponding figures were 0·05 and 2·2%, compared with 7·9 and 3·2%, respectively. A difficulty is that seed 'fuzz' and other debris cause lumps to form in the seed dressing drums, so that some seeds do not get a thorough covering and are prone to infection from spores surviving in the fuzz. Special equipment will need to be devised.

Last (F. T.). **Stem infection of Cotton by Xanthomonas malvacearum (E. F. Sm.) Dowson.**—*Ann. appl. Biol.*, **46**, 3, pp. 321–335, 1 pl., 2 graphs, 1958.

The discovery of unusual leaf symptoms (water-soaking and discoloration of the veins leading to general leaf infection) caused by *X. malvacearum* [cf. **11**, p. 511; **37**, p. 237] in the 1956–7 Sudan cotton crop led to stem inoculation experiments at the Gezira Research Station, Wad Medani. The extent of internal and external stem discoloration and the probability of vascular symptoms being caused in leaves by bacteria moving within the host increased with increasing nearness of the site of inoculation to the apex and with increasing concs. of inoculum. Tissue adjacent to affected veins became water-soaked, and leaf sectors dependent upon these veins became pale, dried, and died. These symptoms usually developed in the expanding leaves 14–55 days after stem inoculation.

The amounts of stem discoloration and the probabilities of leaf symptoms developing were less when hypocotyls of older (and therefore taller) plants were inoculated than when those of very young ones were used, but the probabilities of leaf symptoms developing were similar when other young tissues of either young or old plants were inoculated.

Gossypium hirsutum was less affected by stem inoculations than *G. barbadense*. Of the leaf-resistance factors tested, the gene B_{6m} alone imparted stem resistance.

LEDUC (AGNÈS). **Sur les micromycètes alternarioides de la flore fongique des graines de Lins.** [On the alternarioid microfungi of the fungal flora of Flax seeds.]—*Rev. gén. Bot.*, **65**, 776, pp. 541–580, 44 fig., 1958. [26 ref.]

The fungi described (morphology, biology, and physiology) from the Muséum National d'Histoire Naturelle, Paris, all from flax seeds, are *Peyronellaea fumaginoides*, a new sp. *P. nicotiae* Leduc, *Alternaria tenuis* auct. (2–84% seed infection) [cf. **26**, p. 452], *A.* sp. cf. *humicola*, *A. circinans* [*A. brassicicola*] (also on *Linum campanulatum*), *A. linicola* [cf. **25**, p. 582; **30**, p. 360], *Stemphylium consortiale*, *S. lanuginosum* (also on *L. campanulatum*), and *Pleospora herbarum* [cf. **24**, p. 42] (on up to 90% of seeds of *L. campanulatum* and also on *L. alpinum* and *L. austriacum*).

A. linicola appears to exert no injurious effect on germinating flax seeds, but the seedlings do not get beyond the stage of expanding cotyledons and degenerate after a fortnight. Some have 3 cotyledons, others 2 with one hypertrophied. Affected seedlings bear numerous brownish-red spots. The pathogenic effects and the ability of the fungus to fructify diminished with successive transfers. Sporulation occurred only in the presence of the living host. Experimental evidence appeared to confirm the view that at first, at least, *A. linicola* is pathogenic by reason of the emission of toxins which diffuse through the host and cause a necrosis. They are also present in the culture medium, which has a similar necrotic effect upon the seedlings, only to a more limited degree.

MACMILLAN (W. G.), BASU (S. N.), & PAL (P. N.). **Protection of Jute materials against microbiological and actinic deterioration. Part I—evaluation of some proofing agents against microbiological attack. Rot-proofing of Jute by treatment with soluble copper salt.**—*J. sci. industr. Res.*, **16** C, pp. 13–24, 1 diag.; **16** A, 3, pp. 135–137, 1957.

In this extensive series of experiments with chemical compounds at the Indian Jute Mills Association Research Institute, Calcutta [cf. **36**, p. 527], resistance to rot caused by *Aspergillus fumigatus*, *Chaetomium indicum*, *Curvularia lunata*, *Penicillium rubrum*, and *P. wortmannii* was determined on leached and unleached samples by soil incubation and multiple culture. Only compounds with Cu as the main toxic ingredient were of any practical value, giving a satisfactory performance in both tests even after leaching. The best results were obtained with copper naphthenate and compounds of 8-hydroxyquinoline and cupferron.

Another series of experiments showed that a considerable degree of resistance to rot was secured by dipping samples in, e.g. copper sulphate or acetate. It is suggested that the Cu is bound by chemical combination with certain reactive groups, such as carboxyl, present mainly in the non-cellulosic constituents of jute. In view of its relative cheapness and simplicity, this mode of treatment appears to offer practical possibilities.

BRIERLEY (P.) & TRAVIS (R. V.). **Soil-borne viruses from Chrysanthemum and Begonia.**—*Plant Dis. Reptr*, **42**, 9, pp. 1030–1033, 1 fig., 1958.

At Beltsville, Maryland, soil-borne viruses isolated from Market Orange (symptomless) and Shoesmith chrysanthemums from England and from Belgian begonia leaves showing light and dark green spotty mottling with conspicuous, roughly circular, dark green blotches were found to belong to the tobacco necrosis group, though differing from those previously described in invading tobacco systemically [but see **37**, p. 420] and failing to infect bean (*Phaseolus vulgaris*) and cowpea. Infection in chrysanthemum was localized; the viruses were not detected in tip cuttings or roots and would probably not be maintained during commercial

propagation. The isolates from begonia and Shoesmith were associated with strains of cucumber mosaic virus.

Khristova (Eleonora). Нови болести по украсните растения в България и средства за борба с тях. [New diseases on decorative plants in Bulgaria and their control.]—Овощарст. и Градинарст. [*Ovoshtarst. & Gradinarst.*], *1958*, **1**, pp. 38–41, 2 fig., 1958.

This information from the Institute of Plant Protection, Sofia, notes that cyclamen wilt (*Fusarium oxysporum* var. *auranticum*) was recorded for the first time in 1952 and was epiphytotic in 1953. Treating greenhouse soil and flower pots with 0·25% germisan nasbaïtse gave good results. *Verticillium* wilt (*V. albo-atrum*), affecting cineraria during flowering, and also white chrysanthemums, is believed to be a new host record and was recorded for the 1st time near Sofia, as was also rust (*Coleosporium senecionis*) on cineraria in 1953. Dusting with S when symptoms 1st appear decreased the incidence. Powdery mildew on cineraria (*Erysiphe cichoracearum* [cf. **31**, p. 555], noticed in 1953 and epiphytotic in 1956, is also a new host record. Rust (*C. campanulae*) on *Adenophora potanini*, *A. denticulata*, *Campanula miriabilis*, and *C. muralis* was 1st recorded in 1957. Rot (*Botrytis cinerea*) was newly recorded on Shabo and American carnation vars.; lowering humidity in the greenhouse is recommended. Leaf blotch (*Cladosporium paeoniae*) on peony was 1st recorded in 1957 in the Kostinbrod region. Bordeaux mixture (1%) should be applied when symptoms appear, if preliminary tests have shown that the var. is not scorched by it.

Raabe (R. D.). **Some previously unreported non-woody hosts of Armillaria mellea in California.**—*Plant Dis. Reptr*, **42**, 9, p. 1025, 1958.

Natural infection was observed on *Amaryllis vittata*, *Impatiens oliveri*, *Pelargonium domesticum*, and *P. peltatum* [cf. **30**, pp. 79, 196], all believed to be new hosts, and on *Fuschsia hybrida* (previous record unpublished).

Robinson (J. A.). **Control of Carnation diseases in New Zealand.**—*N.Z. Pl. Gdns*, **2**, 5, pp. 212–218, 1957.

Symptoms and control methods are given from the Plant Diseases Division, Auckland, for the diseases caused by *Pellicularia filamentosa* [*Corticium solani*], *Sclerotium rolfsii*, *Sclerotinia sclerotiorum*, *Fusarium dianthi*, *Verticillium dahliae*, *Uromyces dianthi*, *Septoria dianthi*, *Heteropatella valtellinensis* [**32**, p. 482], *Heterosporium echinulatum* [*Didymellina dianthi*], *Alternaria dianthi*, mosaic [carnation mosaic virus], split calyx (a physiological disorder), and *Ustilago violacea*, a new record (*N.Z. Gdnr*, **13**, pp. 800–801).

The vars. Robin Thain, Goldrey, John Woodhead, and Dusky Maid are fairly resistant to *C. solani*; Rose Clove, Robin Thain, Apricot Bizarre, and Royal Mail to *F. dianthi* and *V. dahliae*; Rose Clove, Otaki Pink, and most modern varieties to *U. dianthi*; Rose Clove, Barridale, Crimson Clove, and Dainty Bride to *S. dianthi*; and Dainty Bride, White Sim, Pink Sim, Crimson Clove, Rose Clove, and Heather Pink to *H. valtellinensis*, which was particularly persistent in the wet winter of 1956. *D. dianthi* is as destructive as *H. valtellinensis* and fairly prevalent.

Messing (J. H. L.). **Mineral nutrition of Carnations.**—*J. Sci. Fd Agric.*, *1958*, 4, pp. 228–234, 4 fig., 1958.

After reviewing the literature the author describes deficiency symptoms in young and mature plants of White Maytime, Spectrum, and William Sim, grown at the Glasshouse Crops Research Institute, Rustington, in sand cultures [**32**, p. 610; **33**, p. 656].

Gould (C. J.). **The dry rot disease of Gladiolus.**—*Plant Dis. Reptr*, **42**, 9, pp. 1011–1024, 3 fig., 1958. [75 ref.]

Recent information on the disease, caused by *Stromatinia* [*Sclerotinia*] *gladioli* [**37**, p. 665], is reviewed. Recommendations for its control in western Washington include dipping the corms for 5 min. in thiram (8·2 lb. active/100 gal.) just before planting, preferably in non-infested soil; if the soil is infested it should first be treated with thiram (300 lb./acre), vapam (400), or methyl bromide (2 lb./100 sq. ft.) according to the manufacturer's directions. Corms should be harvested early and cured rapidly at 80–90° F.

Mráz (F.). **Bacteriosa Mečíků.** [Bacteriosis in Gladioli.]—*Živa*, **5**, 6, pp. 216–217, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 13, p. 212, 1958.]

Description of the damage on gladiolus corms by *Bacterium marginatum* [*Pseudomonas marginata*] in Czechoslovakia, with the recommendation that the external scales of the corms should be removed before planting or treatment with 1·5% formalin given.

Raabe (R. D.) & Lenz (J. V.). **Septoria leaf scorch of Azalea.**—*Calif. Agric.*, **12**, 10, p. 11, 1 fig., 1958.

Septoria azaleae [**12**, p. 696], inducing irregular, angular, brown lesions, often surrounded by a yellow zone in the later stages, is severe on azaleas [*Rhododendron*] in California, especially in the winter, and where infection is heavy all the leaves fall save for a few terminal rosettes. In comparative spray trials at Eureka dithane Z-78 and zerlate, applied at the recommended concs. in spring and autumn after pinches, gave the best control (assessed in June). Dyrene gives excellent control but injures some vars.

Wenham (H. T.) & Latch (G. C. M.). **Fungal leaf-spot diseases of Cocksfoot (Dactylis glomerata L.) in the Manawatu. II. Purple leaf-spot caused by Stagonospora maculata (Grove) Sprague, and leaf fleck caused by Mastigosporium rubricosum (Dearn. et Barth.) Sprague.**—*N.Z.J. agric. Res.*, **1**, 5, pp. 800–808, 7 fig., 1958.

S. maculata [**32**, p. 385] and *M. rubricosum* [cf. **36**, p. 191] isolated from leaf spots on cocksfoot [**37**, p. 591] reproduced the diseases, which are described, on inoculation; neither disease is of economic importance in New Zealand.

Zummo (Natale) & Plakidas (A. G.). **Brown patch of St. Augustine Grass.**—*Plant Dis. Reptr*, **42**, 10, pp. 1141–1147, 3 fig., 1958.

Brown patch of *Stenotaphrum secundatum*, shown by isolation and inoculation to be caused by *Rhizoctonia* [*Corticium*] *solani* [**33**, p. 102], is prevalent and destructive in Louisiana. In southern areas it occurs from late Sept. or early Oct. to the end of May, spread being most rapid in spring and autumn. On naturally infected lawns in the New Orleans and Baton Rouge areas one terraclor spray at 20–136 g./100 sq. ft. gave complete control in 31 tests; at rates above 100 g. it was phytotoxic, causing a bright red discoloration which faded in 2–3 weeks. Puratized 177 (100% phenyl amino cadmium dilactate) at 10 g. was effective in two tests [cf. **36**, p. 701].

Zogg (H.). **Versuche zur chemischen Bekämpfung des Kleekrebses (Sclerotinia trifoliorum).** [Experiments on the chemical control of Clover rot (*S. trifoliorum*).]—*Mitt. schweiz. Landw.*, **5**, 10, pp. 165–172, 3 fig., 1958.

In 5 of 22 field trials during 1953–57 at the Eidgenossische Landwirtschaftliche Versuchsanstalt, Zürich-Oerlikon, Switzerland, spraying with brassicol super at 30 kg./1,000 l./ha. or with 50% hexachlorobenzene at the same rate gave the best control of clover rot [cf. **36**, p. 702] with 3·2, 8·4, 7·2, 4·2, and 11·2% infection

against 68·7, 74·8, 88·6, 57·2, and 21·2% in the untreated. Brassicol super is recommended at 25 kg./1,000 l./ha. to be applied after the last cut before the first snow.

Kilpatrick (R. A.). **Curvularia leaf blight of Clovers and its causal agent, Curvularia trifolii.**—*Phytopathology*, **48**, 9, pp. 513–515, 1958.

At the University of New Hampshire, Durham, *C. trifolii* [**30**, p. 470; **35**, p. 792] was found to sporulate more readily on shallow Difco potato dextrose agar (10–20 ml./Petri dish) than on a deeper layer. Spores germinated within 2 hr. in 0·1% sodium citrate. The fungus survived in overwintering clover leaves until they decomposed. Ladino and other white clovers were susceptible on inoculation, the symptoms being most severe on young seedlings. From 14,000 white clover seedlings 32 with high resistance were selected. All vars. of red clover inoculated were susceptible, though Thomas showed some resistance. Of 37 spp. of *Trifolium* 6 were resistant, 13 intermediate, and 18 susceptible. Lucerne, *Medicago scutellata*, and *Ebenus cretica* proved moderately susceptible; only *Gladiolus*, of other genera inoculated, produced symptoms, flecks developing in 7–10 days, but no larger lesions. *C.t.* f. *gladioli* [**36**, p. 187] caused no symptoms on Ladino white clover.

Halpin (J. E.) & Hanson (E. W.). **Effect of age of seedlings of Alfalfa, Red Clover, Ladino White Clover, and Sweetclover on susceptibility to Pythium.**—*Phytopathology*, **48**, 9, pp. 481–485, 1 fig., 4 graphs, 1958.

In further studies in Wisconsin [cf. **34**, p. 302] seedlings of these crops were grown in greenhouse sand culture in pots at 20–23° C., 2 glass tubes sunk in the soil being removed when required so that inoculum (washed mycelium) could be inserted without disturbing the roots; the pots were then well watered from above. Of the spp. used *P. debaryanum*, *P. ultimum*, and *P. irregulare* were the most pathogenic, *P. splendens* less so, and *P. paroecandrum* the least. Inoculation at sowing caused seed rotting, especially with *P. debaryanum*, and pre-emergence killing with extensive subsequent damage to survivors. When inoculation was delayed for 1 day there was no seed rotting, but pre-emergence killing was still abundant, with subsequent injury, though a few red clover and Ladino white clover seedlings remained unscathed. Inoculating 2 days after sowing caused no pre-emergence killing, but some post-emergence damping-off in lucerne and sweet clover [*Melilotus* sp.]; red clover and Ladino clover had by then developed complete resistance. When inoculated at 3–56 days all the legumes appeared to be immune.

Éĭbatova (Mme A. D.). Основные болезни Люцерны в Азербайджанской ССР. [The main Lucerne diseases in Azerbaijan S.S.R.]—Бюл. науч.-техн. информ. Азерб. н.-и. ин-та хлопководства. [*Bull. nauch.-tech. inform. Azerb. nauch.-issled. Inst. Khlopkov.*], *1957*, 2, pp. 66–69, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 11, p. 198, 1958.]

In the cotton growing region of Azerbaijan lucerne is heavily infected by *Pseudopeziza medicaginis* [**37**, p. 297] and *Uromyces striatus* [**37**, p. 400]. Infection by *Leveillula taurica* [map 217] and *P. jonesii* is not as widespread but measures for the control of all 4 pathogens are strongly recommended.

Rao (D. K.) & Rao (P. G.). **Powdery mildew disease of Cluster Bean (Cyamopsis tetragonoloba Taub.) and the effect of certain fungicides on its control.**—*Sci. & Cult.*, **24**, 3, pp. 137–139, 1958.

Experimental plots of *C. psoraloides* at the Agricultural College Farm, Bapatla, India, became infected in Nov. 1954 by an *Oidium* sp. [**11**, p. 545] which caused the heavily infected leaves to drop and slowed the growth of the plant. Spraying the foliage on both sides with Bordeaux mixture, wettable S, wettable ceresan, and

cupravit, and dusting with S (each treatment repeated twice at 10-day intervals) reduced the disease by 95·52, 90·78, 77·27, 68·89, and 79·03% by the time the crop was mature. At the same time infection of the untreated fell from 38·4 to 24·6%.

Leal (I.). **La flora blastomicética de la fruto.** [The blastomycete flora of fruits.]—*Rev. Cienc. apl.*, **12**, 4, pp. 212–221, 6 fig., 1958. [41 ref.]

Yeasts were present on the surface of all ripe fruits examined (13 kinds) at the Istituto di Microbiologia, University of Perugia, Italy, in the spring of 1955 [cf. **22**, p. 143]; they were absent from green cherries and apricots. Of the 14 spp. isolated, 9 were spore-forming. *Kloeckera apiculata* occurred on every one of the ripe fruits examined and was the only sp. on the hard-skinned fruits (orange and banana), being followed in order of frequency by *Candida krusei* (36·4%), *C. guilliermondii* (27·2), *C. pulcherrima*, *Pichia membranaefaciens*, and *Saccharomyces ellipsoideus* (18·1 each), and the remaining 8 (9·1 each). *S. ellipsoideus* occurred only on cherry and strawberry. Peaches harboured the largest number of spp. (5), followed by gooseberries (4), including *C. pulcherrima* and *K. apiculata* on both and *C. krusei* and *C. guilliermondii* on the latter.

Julien (J. B.). **Cytological studies of Venturia inaequalis.**—*Canad. J. Bot.*, **36**, 5, pp. 607–613, 2 pl. (31 fig.), 1958.

Studies of overwintered perithecia of *V. inaequalis* [**37**, p. 697] on apple leaves at the University of Toronto and the Canada Dept Agric., Ottawa, indicated that only 1 meiosis occurs in the ascus, which can originate either from croziers or from large budding cells. Ascal nuclei showed varied stainability and could apparently exchange their positions in the ascus. The haploid number of chromosomes was repeatedly determined as 7.

Williams (E. B.) & Shay (J. R.). **The relationship of genes for pathogenicity and certain other characters in Venturia inaequalis (Cke.) Wint.**—*Genetics*, **42**, 6, pp. 704–711, 1957.

At the Dept of Botany and Plant Pathology, Purdue University, Indiana, 4 factors controlling pathogenicity in 3 races of *V. inaequalis* [cf. **36**, p. 767], 2 conditioning reduced virulence on *Malus sikkimensis*, and single factors controlling green mycelial colour and sex compatibility were studied with respect to linkage relationship and centromere distance. All except 3 (p–12^1, p–8^+, and p–9^+) were inherited independently of each other and of their respective centromeres.

Petrushova (Mme N. I.). Испытание фуклазина в борьбе с паршой Яблони. [Tests with fuclasin for the control of Apple scab.]—Бюл. науч.-техн. информ. Гос. Никитск. ботан. Сад [*Bull. nauch.-tech. inform. bot. Gdn Nikita*], *1957*, 2, pp. 36–38, 1957. [German summary. Abs. in *Referat. Zh. Biol.*, *1958*, 13, p. 209, 1958.]

At the State Farm 'Plodovod', Crimea, U.S.S.R., 1 and 1·5% fuclasin sprayed on 26 Apr., 24 May, 15 June, 22 July, and 12 Aug. on the apple vars. Montuaner and Champagne Reinette proved more effective against scab [*Venturia inaequalis*: **36**, p. 481] than 1% Bordeaux mixture and other compounds.

Byrde (R. J. W.) & Waugh (Nora M.). **Preliminary tests of potential orchard fungicides.**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 89–93, [1958].

In laboratory tests on 11 compounds *n*-dodecyl guanidine acetate, 2:4-dichloro-6-(*o*-chloranilino)-*s*-triazine, and *o*-hydroxy-diphenyl inhibited the germination of conidia of *Venturia inaequalis* and mycelial growth of *Sclerotinia laxa* and are recommended for orchard trials, though the last compound proved somewhat phytotoxic at 0·1%.

Ciferri (R.), Corte (A.), & Montemartini (A.). **Myiocopraloa speirea (Fries) Cif. agente delle 'croste puntiformi' delle Mele.** [*M. speirea*, the cause of 'punctiform crusts' on Apples.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **15**, pp. 10–20, 2 pl., 1958. [English summary.]

The cultural characters, pathogenicity, morphology, nomenclature, and synonymy of the fungus, usually named *Microthyriella rubi* [**35**, p. 24], found in the autumn of 1953 on an almost dried-up branch of *Rubus* sp. in the Botanical Garden, Pavia, are described. The conidial state is commonly found in Italy causing fly-speck of apple, but this appears to be the first report of the ascigerous state in the country. Cultures from asci gave rise only to the sterile form (often called *Microsticta pomi*); inoculations were positive only on potato tubers but these gave rise to punctiform stromata (thyriothecia) identical with those of 'fly speck'.

From a study of the literature and the type specimen it appears that the oldest binomial is *Sphaeria speirea* Fries (1815). *Stomiopeltis rubi* Petrak is the same fungus. The new genus proposed, *Myiocopraloa* Cif., is allied to *Stomiopeltis*, but has a hyphopodiate mycelium and asci without paraphyses. A list of 20 synonyms of *M. speira* is given.

Rasmussen (P. M.) & Jepsen (H. M.). **Forsøg med bekæmpelse af Gloeosporium på Æbler.** [Experiments on the control of *Gloeosporium* on Apples.]—*Tidsskr. Planteavl*, **62**, 2, pp. 280–291, 1958. [English summary.]

G. [*Neofabraea*] *perennans* is stated to be more prevalent than *G. album* [see below] and *G. fructigenum* [*Glomerella cingulata*] on apples in Denmark. On the vars. Beauty of Boskoop, Cox's Orange, Ingrid Marie, Jonathan, and Blangstedfaard No. 156 (Cox's Orange × Filippa) sprays of pomarsol and captan from 1952–56 conferred satisfactory protection against *N. perennans*, 7 applications throughout the season giving the best control. Fermate and Bordeaux mixture were effective but the residues left on the fruits exclude them from use in later treatments. Sulphur and fuclasin ultra (the latter tested only in 1 season) were ineffectual.

Rasmussen (F. M.). **Forsøg med opbevaring af Æbler efter forskellige plukketidspunkter.** [Experiments on the storage of Apples after various times of picking.]—*Tidsskr. Planteavl*, **62**, 1, pp. 26–46, 1 diag., 9 graphs, 1958. [English summary.]

At the State Experiment Station, Blangstedgaard, Denmark, from 1949–55 Cox's Orange Pippin and Bramley's Seedling apples were picked (*a*) 10 days before and (*b*) at the normal time, and (*c*) 10 days later, placed in (*a*) ventilated, (*b*) cold, and (*c*) gas storage, and examined at 3–6-weekly intervals for storage disorders [cf. **31**, p. 66].

Cox's Orange was affected mainly (85%) by rots due to *Gloeosporium album* and *G.* [*Neofabraea*] *perennans* [see below], which were substantially reduced by early picking but put forward 1 month when this was delayed for 20 days or so. This var. is susceptible to internal breakdown only in gas storage; no correlation could be determined between maturity at picking time and incidence. Early picking increased evaporation and consequent loss of weight, leading to shrinkage, and in 1 season (1954–5) it contributed to heavy losses from low-temperature breakdown. In 1956, 61% of Cox's Orange from the 1st picking were placed in the 1st quality group (min. 55 mm. diam.), 71% from the 2nd, and 81% from the 3rd.

Bramley's Seedling sustained fairly heavy damage from lenticel spot in ventilated storage, especially when picked early. In cold storage the principal disorders were superficial scald and internal browning, early pickings being highly susceptible to the latter. There was no apparent connexion between early picking and increase of scald.

It is concluded that vars. like Cox's Orange, Ingrid Marie, and Laxton's Superb, which are highly susceptible to *Gloeosporium* rots, should be picked as soon as they have attained a reasonable development in respect of size and quality, whereas others may safely be left to ripen further.

Oort (A. J. P.). **Gloeosporium-vruchtrot bij Appels.** [*Gloeosporium* rot of Apples.] —*Meded. LandbHogesch. Gent.*, **21**, 3, pp. 507–518, 9 fig., 4 graphs, 1956. [English summary. Reprinted as *Meded. Lab. Phytopath. Wageningen* 167, 1957.]

Golden Delicious, Jonathan, and Laxton Superb proved highly susceptible to fruit rot due to *G.* [*Neofabraea*] *perennans* and *G. album* in cold storage [cf. **37**, p. 47 and above]. Examination of apples from 24 orchards showed that although the 2 spp. could occur together, generally one or the other prevailed in a given orchard. A large-spored (conidia $16{\cdot}4–28\times3{\cdot}6–6{\cdot}8\,\mu$, av. $21{\cdot}5\times5{\cdot}1\,\mu$) form of *N. perennans* was found on Jonathan and Goudreinet. In wound-inoculation experiments both spp. produced branch cankers on which acervuli appeared after 1–2 months [cf. **35**, p. 685; **38**, p. 89]. The natural cankers observed do not always suffice to explain the general occurrence of the rot, but as yet no other sources of infection have been found. Data obtained indicate: (1) heavier infection of fruit on the upper parts of the trees, (2) incidence on fruit from a 2nd picking is greater than that on the 1st, or where continual picking is practised, and (3) that the distribution of the fungi in a given orchard may be very irregular, accounting for anomalous results in control trials. Incidence varies greatly between orchards. Enclosing the fruits in polyethylene bags during the whole experimental period until harvest greatly increased the level of infection in storage.

Voroshilova (Mme E. A.). Влияние Яблони на количество микроорганизмов почвы. [The effect of Apple trees on the numbers of soil micro-organisms.] —*Microbiology, Moscow*, **25**, 6, pp. 697–699, 1957. [English summary.]

Counts at the Uman[1] Agricultural Institute, Ukraine, U.S.S.R., in 1953–4, established that the rhizospheres of apple trees contain more fungi and bacteria than surrounding soil. The fungi increase and the bacteria decrease with depth. The highest number of bacteria was isolated during flowering and fruiting, whereas fungi were most abundant during the growth of suckers in spring.

Askew (H. O.) & Chittenden (E.). **The effect of magnesium top dressings on the growth of young Apple trees.**—*N.Z.J. agric. Res.*, **1**, 5, pp. 796–799, 4 fig., 1958.

It is reported from the Cawthron Institute, Nelson, that in an orchard where a previous Mg deficiency trial had been carried out [**23**, p. 233] the controls suffered so seriously from Mg deficiency that despite applications of 12 lb. dolomite+7 lb. $MgSO_4$/tree in 1947 and 6 lb. dolomite in 1949 some died on both treated and untreated soil. Two young Sturmers were then planted in 1951, 1 on the treated soil, which received a further 6 lb. dolomite in 1952, the other on the untreated. Both received a standard NPK dressing annually. By 1952 the control tree was seriously defoliated and by 1955 only 4 ft. 6 in. high, compared with the treated which was 6 ft. 10 in.

Posnette (A. F.) & Cropley (R.). **Quince indicators for Pear viruses.**—*J. hort. Sci.*, **33**, 4, pp. 289–291, 3 pl., 1958.

During further studies at East Malling [**36**, p. 330] 2 clones propagated from seedlings of quince E (Portugal quince) proved suitable indicators for the viruses latent in pear, 2 additional viruses being identified. Yellow blotch virus, demonstrated in a S. African var., Packham's Triumph, is rare in England; it caused diffuse yellow blotches on the quince leaves. Bark necrosis virus was found in Clapp's Favourite,

Beurré Hardy, and William's Bon Chrétien; it caused necrosis, which in some instances spread over several in., round bark patch grafts.

Black end of Pears.—*Res. Bull. Dep. Agric. Vict.* 1, 6+7 (unnumbered) pp., 12 fig., [? 1958].

Pear black end [**33**, p. 432] within and between affected trees may differ markedly from season to season and varietal symptoms (which are described) vary between and within vars., suggesting that different types of this disease may exist. Ring spot symptoms in Packham's Triumph indicate a possible virus origin, but attempts to perpetuate or transmit the disease by grafting have been unsuccessful. Winter Nelis grafted on to affected trees has remained symptomless in all except 2 cases. Injection of trees with boric acid, calcium nitrate, ammonium molybdate, or a complete solution did not affect the occurrence of the disease.

Lentz (P. L.). **Septoria spot of Plum fruits.**—*Plant Dis. Reptr*, **42**, 10, pp. 1123–1125, 3 fig., 1958.

The agent of a fruit and leaf spot of Bruce plums near Jacksonville, Texas, was determined at Beltsville, Maryland, to be *S. pruni* Ell., with which *S. purpureocincta* is regarded as synonymous. This appears to be the first record of the fungus causing fruit spots, which were blue, circular to slightly irregular, 3–7 mm. diam., with conidial fructifications embedded in the superficial tissues of the fruit.

Wagnon (H. K.), Breece (J. R.), & Schlocker (A.). **Stubby twig, a new virus disease of Peach and Nectarine in California.**—*Phytopathology*, **48**, 9, pp. 465–468, 1 fig., 1958.

Field observations by the State Dept Agric., Sacramento, led to the identification of this virus, first observed in 1952 during budwood source inspections and since found on 139 properties in 15 countries. The symptoms, described in detail, include increasing chlorosis and rolled growth of the leaves, shortening of the internodes on affected twigs, in which the tissues outside the cambium are overdeveloped in relation to the xylem, and decreased fruit production. Among the symptoms that distinguish stubby twig from peach western-X disease virus and its yellow leaf roll str. [**30**, p. 375] are the spread of yellowing from the tip of the leaf, the brittleness of infected twigs, the red to reddish-brown spots on some leaves, and the light- and dark- green sectoring that appears in the spring on certain leaves on wood infected for 2 yr. (occasionally 1) or more. Budwood inoculations during 1952–56 resulted in positive transmission from 12 of 14 trees; 33 trees of 8 vars. of peach and nectarine were infected; 48 vars. have been found susceptible in the field. Spread of the disease is apparently only by infected budwood.

Jafar (H.). **Studies on the biology of Peach rust (Tranzschelia pruni-spinosae Pers.) in New Zealand. Investigation on the control of Peach rust (Tranzschelia pruni-spinosae Pers.).**—*N.Z.J. agric. Res.*, **1**, 5, pp. 642–651, 7 fig.; pp. 660–664, 1958.

T. pruni-spinosae, which occurs in all fruit-growing districts of New Zealand [Cunningham, **11**, p. 263], has been found to overwinter on twigs of stone fruit as uredosori, fresh uredospores arising in the spring. *Anemone*, the alternate host, has a restricted distribution in N.Z.

The 2nd paper notes that zineb, captan, and thiram (6 or 10, 10, and 10 spray applications, respectively, each at 2 lb./100 gal. water) were superior to lime-sulphur+colloidal S, zineb being apparently the most effective. Soil application of K, P, and N fertilizers had no effect, except that heavy application of N increased incidence. Zinc sulphate+dehydrated lime used as foliar sprays reduced infection, but not significantly at the 5% level. Spray applications 3 times during the Jan.–Mar. period followed by application in Nov. seem likely to control the disease.

Guba (E. F.). **The Peach constriction disease.**—*Phytopathology*, **48**, 9, pp. 522–524, 5 fig., 1958.

The author considers that the pathogen associated with the common stem constriction and leaf spot of peach, and with the less common peach fruit rot sometimes attributed to *Phoma persicae* [**36**, p. 770], is in each case *Fusicoccum amygdali* [**38**, p. 16].

Berend (S.). **Zur Ätiologie der Aprikosenwelke.** [On the etiology of Apricot wilt.] —*Phytopath. Z.*, **33**, 4, pp. 399–402, 2 fig., 1958. [English summary.]

At the Forschungsinstitut für Pflanzenschutz, Budapest, the pathogen of an apricot wilt in Hungary [**36**, p. 37] was identified as *Verticillium dahliae*. First symptoms were a grey-yellowish-green coloration of the leaves, leading to their early shedding. Later there was a marked discoloration of the wood in the trunk and crown. The fungus remains localized in the infected parts of the root, symptoms in the aerial parts of the tree being produced by remote action of toxic substances.

Doshumov (U.). Влияние климатических условий на развитие монилиального ожога Абрикоса в Средней Азии. [The effect of climatic conditions on the occurrence of moniliasis scald of Apricots in Middle Asia.]—*Trud. vsesoyuz. Inst. Zashch. Rast.*, **11**, pp. 144–151, 2 diag., 1958.

In the Isfarinskiĭ district, Leninabad region, U.S.S.R., *Monilia cinerea* [*Sclerotinia laxa*: **36**, p. 554] caused great damage to apricots during the summers of 1954–5 owing to heavy rainfall and mists. The disease is known in most parts of Middle Asia [cf. **8**, p. 89] but has never till now presented real danger to apricot growing in Tadzhik, Kazakh, and Azerbaijan S.S.R. The disease has proved serious twice in the past 10 yr., owing to unusually low temps. occurring at flowering. Removal of infected tissue and fungicidal spraying must be done before flowering. Large scale cultivation of apricots in northern central Asia is not recommended.

Graham (S. O.). **Factors in propagating presumably virus-free Prunus understock clones by softwood cuttings.**—*Bull. Wash. St. agric. Exp. Sta.* 581, 34 pp., 7 fig., 1958. [70 ref.]

An account is given of the horticultural problems involved in raising virus-free *Prunus* clones from material selected as free from the [peach] ring spot virus complex after indexing on Lovell peach and Kwanzan and Shirofugen flowering cherry.

Fulton (R. W.). **Identity of and relationships among certain Sour Cherry viruses mechanically transmitted to Prunus spp.**—*Virology*, **6**, 2, pp. 499–511, 3 fig., 1958.

In further studies at the Dept of Plant Pathology, University of Wisconsin, Madison [cf. **37**, p. 293], viruses A, B, E, and G [cf. **36**, p. 599] were transmitted by carborundum inoculation to seedlings of 8 of 15 *Prunus* spp., of which *P. pennsylvanica* and *P. mahaleb* were the most readily infected. Graft inoculations from infected seedlings to sour cherry trees showed virus A to be the agent of recurrent necrotic ring spot, and G of ordinary [peach] necrotic ring spot of sour cherry [**38**, p. 92]. B caused chlorotic spots and rings with slight necrosis, symptoms apparently not previously described in sour cherry. E induced a necrotic spotting somewhat resembling necrotic ring spot, except for the development of enations on the lower leaf surface in the year following inoculation. Cross-protection tests in *P. pennsylvanica* showed A and G to be related. B and E were not related to each other nor to A or G. Neither A nor B infected peach seedlings. *P. pennsylvanica* appears to be useful for rapid cross-protection tests.

Blumer (S.). **Beiträge zur Kenntnis von 'Cylindrosporium padi'.** [Contributions to the knowledge of '*C. padi*'.]—*Phytopath. Z.*, **33**, 3, pp. 263–290, 8 fig., 1 graph, 1958. [English summary. 36 ref.]

Experiments at the Eidgenossische Versuchsanstalt für Obst-, Wein- und Gartenbau, Wädenswil, Switzerland, showed that '*C. padi*' [**32**, p. 261; **37**, p. 727] can be transferred from sweet cherry to sour cherry and *Prunus mahaleb* and from *P. padus* to sweet cherry and *P. mahaleb*, but is not easily transmitted to and does not grow well on cherry plum, plum, apricot, or Shirofugen (*P. serrulata*). Isolates of the fungus from Europe and [of *Higginsia hiemalis*] from the U.S.A. vary a great deal in their cultural behaviour and have different temp. requirements, but all were heterotrophic for aneurin. Amygdalin can be used as a C source. There are no morphological differences between the European and U.S.A. material as regards macro- and microconidia. The fungus overwinters on stone fruits in Europe as a stroma which arises near the acervulus but does not form apothecia. The macroconidial fructification is considered not to belong to *Cylindrosporium* Greville.

Crosse (J. E.) & Garrett (Constance M. E.). **Experiments on the movement of streptomycin in Cherry trees.**—*Ann. appl. Biol.*, **46**, 3, pp. 310–320, 1 pl., 1 graph, 1958.

In further work at East Malling Research Station on the control of *Pseudomonas mors-prunorum* in cherry trees by foliar sprays of streptomycin [cf. **37**, p. 94; **38**, p. 15] the possible systemic effect was investigated. With one exception the experiments were conducted on potted greenhouse or field trees of the susceptible var. Napoleon. Streptomycin sulphate was used, usually at 0·1%, which had an equivalent potency of about 730 i.u./ml., or just over 3 times that of the sprays used in previous field experiments [**36**, p. 535]. The presence of antibacterial activity in the tissues was determined by tests on previously inoculated leaves [cf. **36**, p. 253] or by assaying tissues or tissue macerates on 2% peptone agar plates seeded with *Bacillus subtilis*.

Penetration by the antibiotic appreciably suppressed infection by *P. mors-prunorum*; uptake into detached leaves progressed with time. Widespread and rapid distribution of streptomycin in the transpiration stream followed injection through petioles, but translocation from immersed intact laminae was much slower; the fact that vaselining the cut ends of petioles or damaging the vascular tissue prevented movement of the antibiotic from immersed leaves into the petiole suggests that translocation from the laminae takes place in the transpiration stream in the same way as from injection. The antibacterial activity detected in fruiting spurs after field spraying, however, did not appear to depend on the presence of leaves at the time of spraying, but to result from direct penetration through the dermal tissues of the spur. This was shown by assay of spurs bearing leaves wetted with streptomycin and of defoliated spurs sprayed with the antibiotic. It is concluded that widespread systemic distribution of the antibiotic is unlikely to result from foliar sprays at field concs. and that translocation is probably of minor significance compared with direct penetration.

Natal'ina (Mme O. B.) & Polataeva (Mme G. V.). К изучению биологии грибка **Phragmidium rubi-idaei Karst.**—возбудителя ржавчины Малины. [The study of the fungus *P. rubi-idaei*—the causal agent of rust on Raspberry.]—Тр. Саратовск. с.-х. ин-та [*Trud. saratov. sel.-khoz. Inst.*], **10**, pp. 182–190, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 11, pp. 200–201, 1958.]

A detailed study of raspberry rust in the south-west U.S.S.R. Chemical treatment should begin at the end of Apr. or the beginning of May. Autumn deep hoeing of the soil decreased primary infection by 56·1%.

Wood (F. A.). **Observations on the effects of copper fungicides on Strawberry foliage in central New Brunswick.**—*Canad. J. Pl. Sci.*, **38**, 4, pp. 477–480, 1958.

Tests in 1956 at the Canada Dept Agric., Fredericton, New Brunswick, showed that the application of Bordeaux mixture (4–4–40) in June and thereafter to control strawberry leaf spot (*Mycosphaerella fragariae*) was consistently followed by severe and increasing reddening of foliage due to premature formation of anthocyanins. As non-Cu fungicides did not produce this effect they are recommended for all June or later applications.

Problems and progress in Banana disease research.—x+36 pp., 3 col. pl., 21 fig., Boston, Massachusetts, Dept of Research, United Fruit Co., 1958.

The information in this well-illustrated review, much of which has already been noticed, is in large part the outcome of research in United Fruit Co. Research Laboratories in Honduras, Costa Rica, and Panama. The diseases dealt with are those caused by *Fusarium oxysporum* f. *cubense*, *Mycosphaerella musicola*, *Pseudomonas solanacearum*, fruit diseases due to *Gloeosporium musarum* and *Thielaviopsis* [*Ceratocystis*] *paradoxa*, and miscellaneous diseases including rhizome rot (*Erwinia carotovora*) and pseudostem heart rot (*Fusarium moniliforme* [*Gibberella fujikuroi*] plus saprophytic bacteria) [**36**, p. 199].

Reference is also made to virus diseases, the first reported in the area being infectious chlorosis or virus sheath rot, caused by a strain of cucumber mosaic virus [cf. **35**, p. 905] and observed on the var. Cavendish near Coyoles, Honduras, in late 1955. The chief symptom is a leaf mosaic on plants of all sizes, with the yellow interveinal flecks often coalescing to form streaks or broad chlorotic areas. Vein banding and clearing are common, and necrotic spotting occurs in the leaf midrib and petiole, sometimes causing splitting of the pseudostem in older plants. This condition often results in severe heart rot. Leaves emerging from the crown may display severe chlorosis and rosetting or bunching. Control is achieved by the complete spraying of the ground cover and banana plants with malathion, followed by dieldrin on the ground cover, which prevents the transport of aphid vectors from the area by ants. A further application of both products may be made within a week, followed by destruction of the diseased banana plants. This virus disease is distinct from another reported in Costa Rica [**37**, p. 174].

Osborne (R. E.). **Breeding the immune Banana.**—*Occ. Bull. Banana Bd Res. Dep. Jamaica* 2, 8 pp., 9 fig., 1958.

A brief account of the history and organization of the breeding of banana vars. in Jamaica and Trinidad to combine resistance to Panama disease [*Fusarium oxysporum* f. *cubense*] and *Cercospora* leaf spot [*Mycosphaerella musicola*: **37**, pp. 174, 362] with acceptable commercial qualities. Two promising seedlings are at present under trial.

Desrosiers (R.). **The control of Sigatoka disease on the Gros Michel Banana by low volume spraying in Ecuador.**—*Tech. Bull. Minist. Fom. Prod., Ecuador*, 1, 58 pp., 1 pl., 12 fig., 2 graphs, 1958.

A comprehensive and enlightening account of Sigatoka disease (*Mycosphaerella musicola*) as it occurs in Ecuador and its control [cf. **37**, p. 362 *et passim*]. Spraying equipment of all the types used including mechanical, portable, and helicopter, as adapted to local conditions is described and illustrated, and the data resulting from various spray formulations are tabulated.

Cuillé (J.), Guyot (H.), Kitrosser (I.), & Lecomte (J.). **Le roséographe photographique.** [The photographic dew-recorder.]—*Fruits d'outre mer*, **13**, 7, pp. 293–297, 4 fig., 2 diag., 1958.

An apparatus for measuring the duration of dew deposits [cf. **37**, p. 268] as they

relate to infection of banana leaves by *Cercospora musae* [*Mycosphaerella musicola*: cf. **37**, p. 545] is described. Every 15 min. an electric clock establishes a new contact, which charges the condenser of an electronic flashlamp. After 15 sec. a second contact closes the circuit of a solenoid which starts the photography by 16-mm. ciné-camera synchronized with the flash-lamp circuit. Parts of the apparatus exposed to the weather are protected by polythene covers and a cover round the lens prevents the formation of dew on the protective filter. The beginning and end of dew formation can be recorded to within 15 min. and its importance estimated according to Duvdevani's gauge (*Israel Explor. J.*, **4**, No. 2, 1954).

Purss (G. S.). **Studies of the resistance of species of Passiflora to Fusarium wilt (F. oxysporum f. passiflorae).**—*Qd J. agric. Sci.*, **15**, 2, pp. 95–99, 1 fig., 1958.

Inoculation studies in Queensland indicated that the resistance of selected passion fruit to *F. oxysporum* f. *passiflorae* [cf. **36**, p. 307] is sufficient only to delay infection and would be valueless commercially. Of other spp. and vars. of *Passiflora* tested, introduced strains of golden passion fruit (*P. edulis* f. *flavicarpa*) were the most promising as resistant rootstocks.

Das (S.). **A Cercospora leaf spot of Aegle marmelos Corr.**—*Sci. & Cult.*, **24**, 3, pp. 140–141, 2 fig., 1958.

C. aeglicola Das is proposed for a previously undescribed sp. of *C.*, recorded for the 1st time in the neighbourhood of Cuttack (Orissa), India, in Dec. 1956. The disease usually appears during the rains and continues until the end of spring. The fungus produced hyaline, 1–7 septate conidia, which are acicular to sub-clavate, straight or sometimes curved, with few oil globules, smooth, 12–80 (44·5) × 4·2 μ.

Thomas (H. E.). **Sickle leaf of Olive.**—*Plant Dis. Reptr*, **42**, 10, p. 1154, 1 fig., 1958.

Sickle leaf [**34**, p. 605], presumably due to a virus, is fairly common in commercial plantings in at least 4 counties in California, where it appears to be confined to the widely grown Mission type of olive. Affected leaves are often chlorotic, particularly along the inner side of the curve, and branches may be stunted and fruit production reduced. The disease, though systemic in individual branches, has not been seen to affect a whole tree and because of its slow development is unlikely to become important. Scions from healthy Mission olive on a diseased tree began to show symptoms in 17 months; inoculated by inarching, Sevillano C trees showed the first signs of infection after 23 months and Mission Nobs after 3 yr.

Graniti (A.). **Note fitopatologiche. III. L'oidio (Leveillula taurica (Lév.) Arn.) del Sesamo in Sicilia.** [Phytopathological notes. III. Mildew (*L. taurica*) on Sesame in Sicily.]—*Riv. Agric. subtrop.*, **52**, 7–9, pp. 410–418, 3 fig., 1 graph, 1958. [English summary.]

In 1954 sesame was attacked for the 1st time in S.E. Sicily by powdery mildew (*L. taurica*) [cf. **36**, p. 446; map 217]. Biometrical data and inoculation tests on other common hosts appeared to confirm the existence of specialized strains of the fungus [**35**, p. 658; **37**, p. 400]. The fungus on sesame would appear to resemble the strains on capsicum and eggplant, but to differ from that on globe artichoke [cf. **32**, p. 536].

Moreau (C.) & Moreau (Mireille). **Le 'blast' des jeunes Palmiers à huile. Observations sur le système radiculaire de l'hôte et sur ses parasites.** ['Blast' of young Oil Palms. Observations on the root system of the host and its parasites.]—*Rev. Mycol., Paris*, **23**, 2, pp. 201–232, 11 fig., 1958. [36 ref.]

A full account is presented of a study of fresh specimens (field or potted) of blast disease of oil-palm seedlings from the Ivory Coast [**37**, p. 733] at the Muséum

National d'Histoire Naturelle, Paris. In the roots of a healthy seedling lignification becomes complete in most of the tissues; in older roots only the aerenchyma and the phloem remain unlignified. The reactions of healthy roots to accidental wounding, including breaking, the emergence of secondary roots, and root curvature in potted plants were also investigated.

The roots of plants in various stages of blast whether from the field or in pots were characterized by a generalized browning, even in the normally white parts. Roots in which lignification had not progressed far were flattened and irregular; the oldest often bore substituted roots. Many roots were aborted. Gummosis was present at the upper levels of older roots. *Fusarium oxysporum* (*bulbigenum*) [cf. **34**, p. 719] and *Rhizoctonia bataticola* [*Macrophomina phaseoli*] were constantly present in the diseased tissues. When affected roots were kept in a damp chamber, a fungus (? *Dactylaria thaumasia*) developed. In moderately to severely diseased roots an *Olpidium* was found, which could not be the cause of primary infection. *Pythium splendens* [**37**, p. 366], a detailed morphological study of which is presented, was always secured when pieces of aerenchyma, little diseased, were plated.

Cellular proliferations (even in the medullary vessels) and the formation of subero-phellodermic zones and of substitution organs are frequent in the roots of 'blasted' plants. The possibilities of regeneration of the oil palm are good, though the root can protect itself only when the pericycle and endodermis are sufficiently lignified. The more numerous the roots which have reached this physiological age along the greater part of their length, the better chance the plant will have of recovering from 'blast', because there will be a sufficient number of roots in a dry season to obtain adequate supplies of water. The effect of cultural methods upon 'blast' is probably correlated with the physiological condition of the roots and the influence they exert upon the microflora and the microfauna of the rhizosphere. 'Blast' is regarded as a form of wilt.

Choudhuri (H. C.). **Potato in West Bengal.**—Home (Publicity) Dept for the Directorate of Agriculture, Government of West Bengal, India. 9*s*. 9*d*.

This book, reviewed in *Amer. Potato J.*, **35**, 9, p. 678, 1958, includes recommendations for disease control, and charts and tables illustrating the author's experimental work in this field.

Darling (H. M.). **North American Potato varieties.**—*Potato Handb.*, **4** (*1959*), pp. 19–41, 1958. [65 ref.]

Short descriptions are given of 122 vars., arranged alphabetically, including notes on disease resistance.

Webb (R. E.). **Schultz Potato virus collection.**—*Amer. Potato J.*, **35**, 8, pp. 615–619, 2 fig., 1958.

This collection of typical cultures of 15 potato viruses, including several strains of some, all isolated in the U.S.A., mostly in Maine, and maintained at Aroostock Farm, Presque Isle, Maine, and at Beltsville, Maryland, has been named in honour of E. S. Schultz, who with D. Folsom built it up during 1916–54. Each culture is maintained separately in plants of the original host var. under insect-proof cages in the field; every year a tuber from each hill is planted in the greenhouse for observation of symptoms and tests for purity of the culture.

Broadbent (L.). **Control of virus spread in Potato crops.**—*Outlook on Agric.*, **2**, 1, pp. 13–15, 1958.

The author shows that in many parts of England and Wales potato stocks can be maintained free from leaf roll virus and rugose mosaic (potato virus Y) for at least 4 yr. by insecticidal spraying [**36**, p. 53; **37**, pp. 28, 367], in contrast to the general

belief that they cannot be kept for more than 2 yr. without deteriorating. Assuming that 'A' certified seed costs £24/ton, including transport, the av. annual saving/acre through using home-grown seed over a period of 4 yr. is estimated at £5–£8. 15*s*. according to the procedure used. These figures include the cost of spraying the whole acreage of ware potatoes once, possibly adding the insecticide to the spray against blight [*Phytophthora infestans*]. If prevention of large aphid populations was universal, seed stocks could be maintained in England and Wales for many years.

KELLER (E. R.). **Auswirkung von Säuberung und Neuaustrieben auf die Saatkartoffelqualität.** [The effect of removal of the haulms and new shoots on the quality of seed Potatoes.]—*Mitt. schweiz. Landw.*, **6**, 6, pp. 87–90, 1958.

The results of tests at the Eidgenössischer Landwirtschaftlicher Versuchsanstalt, Zürich-Oerlikon, Switzerland, during 1953–55 showed that in fields of Bintje and Voran potatoes raised for seed, early systematic removal of haulms infected with potato leaf roll or mosaic (Y) viruses was effective in producing 'seed' fairly free from virus. Complete prevention of virus transmission cannot be achieved even by the earliest attention to affected haulms, as infected plants cannot be identified early enough. New shoots from sprayed plants or in fields struck by hail are more highly susceptible to virus infection than haulms which have developed normally, and should be destroyed.

HARRISON (B. D.). **Ability of single aphids to transmit both avirulent and virulent strains of Potato leaf roll virus.**—*Virology*, **6**, 1, pp. 278–286, 1958.

A strain of potato leaf roll virus causing mild symptoms in potato and *Physalis floridana* [cf. **33**, p. 442] was transmitted more readily by *Myzus persicae* from these hosts to *P. floridana* than was a virulent strain. *P. f.* plants with the avirulent strain seemed immune from the virulent. Single aphids which had transmitted the avirulent strain were able subsequently to acquire and transmit the virulent as readily as did previously virus-free controls. Of plants infected by single aphids carrying both strains, most were infected by one strain only, but both were recovered from some plants with intermediate symptoms.

JERMOLJEV (E.) & PRŮŠA (V.). **Vyšetření výskytu S-viru Bramborů v ČSR a příprava antiséra k tomuto viru.** [Investigation of the occurrence of Potato virus S in CSR and the preparation of antisera against it.]—Abs. in *Preslia*, **30**, 4, pp. 359–360, 1958. [English summary.]

The Epicure and Wilpo potato vars. were severely attacked by potato virus S [str. of potato paracrinkle virus] in the 'seed' growing provinces of Czechoslovakia; 9 of 20 vars. tested were infected. The disease is more widespread in the non 'seed' growing areas. An antigen can be prepared by precipitation of proteins with trichloroacetic acid at pH 4.

BLATTNÝ (C.). **Drchnička rolní, její použití pro polní test při zjišťování stolburoidních onemocnění Bramborů.** [The use of Scarlet Pimpernel in a field test for the detection of stolbur-infected Potatoes.]—Abs. in *Preslia*, **30**, 4, p. 362, 1958. [English summary.]

In Czechoslovakia in 1958 *Anagallis arvensis* and *A. grandiflora* were planted among potatoes and other plants infected by stolbur virus [**38**, p. 74]. Both species displayed 100% yellows symptoms in fields where the disease was unnoticeable on potatoes and other plants.

ULLRICH (J.). **Die Tau- und Regenbenetzung von Kartoffelbeständen. Ein Beitrag zur Epidemiologie der Krautfäule (Phytophthora infestans).** [The wetting of

Potato haulms by dew and rain. A contribution to the epidemiology of haulm blight (*P. infestans*).]—*Angew. Bot.*, **32**, 4, pp. 125–146, 4 fig., 5 graphs, 1958.

The results of further studies (1955–57) at the Institut für Physiologische Botanik, Brunswick, are given, together with a discussion of the problem of forecasting blight [**37**, p. 105; **38**, p. 26]. The author established that the min. infection period, starting from sporangia, was 2½ hr. For 50% infection a moist period of 4½ hr. was required, with a further 10 hr. for the formation of sporangia, i.e. 15 hr. for an infection wave. Heavy dew is sufficient for infection, but not for sporulation. As there is little or no wind on nights with dew, conditions for dispersal are particularly unfavourable; dew is therefore essentially conducive to local spread within an already infected field. In support of this the fact is quoted that primary infection nearly always occurs on the lowest leaves, on which, with a closed canopy, dew hardly forms. Since an important factor in forecasting is the detection of this primary infection, moisture periods caused only by dew should not be considered as critical.

Rain exceeding 0·25 mm. penetrates more deeply into the haulms and, as a result of delayed drying, produces longer moisture periods, which permit the sporulation and dispersal. Investigations revealed that, contrary to Uhlig's opinion [cf. **35**, p. 537], rainfall of less than 1 mm. should not be dismissed as unimportant. Temps. in the depths of the haulm hardly varied from those at a height of 2 m., whereas Uhlig assumed that the haulm temps. were approx. 2° C. lower than in the screen. He therefore established 12° and not 10° as the lower limit for critical weather periods, and as a result, no doubt, important critical periods are overlooked.

Partyka (R. E.), Quinton (R. J.), & Cetas (R. C.). **Some factors concerned with the use of air-blast spray equipment on Potatoes.**—*Amer. Potato J.*, **35**, 8, pp. 601–614, 9 graphs, 1958.

In experiments by the Depts of Entomology and Plant Pathology, Cornell University, Ithaca, New York, 4 commercially available, row-crop, semi-concentrate sprayer attachments were compared by studying the Cu deposit patterns on potato foliage sprayed with Bordeaux mixture. The coverage on 8-in. plants was much better than on full-sized plants; the upper parts received the most spray. In general, coverage was best on the side near the blower; in rows where the air stream could move the foliage the lower surfaces on this side were covered better than the upper, the reverse being true of leaves on the far side of the row. Winds up to 6 m.p.h. did not seriously affect the performance of the machines.

Outbreaks and new records.—*F.A.O. Pl. Prot. Bull.*, **6**, 10, pp. 158–159, 1958.

K. B. Lal reports from the Ministry of Food and Agriculture, New Delhi, that potato wart disease (*Synchytrium endobioticum*) [cf. **32**, p. 641] was observed during the summer of 1957 in a few areas of Darjeeling district, West Bengal, on the var. known locally as 'red round'. The evidence suggests that the disease appeared in 1956 in the high-altitude areas of the State adjoining Sikkim.

Young (D. A.). **A fungus-like structure in Potato tubers and Potato tissue cultures.**—*Amer. Potato J.*, **35**, 7, pp. 585–595, 4 fig., 1958.

This information has already been noticed [**37**, p. 306].

Heeg (T. J.) & Richardson (J. G.). **Potato common scab investigations II. Five years of plot studies on soil reaction changes and incidence of scab as affected by limestone and sulphur applications on Fox fine sandy loam.**—*Amer. Potato J.*, **35**, 9, pp. 662–675, 12 graphs, 1958.

Four annual applications of limestone, each at 2,000 lb./acre (final pH 7·3) or 1,000 lb. (6·5), to an Ontario field of Katahdin potatoes did not appear to increase

the proportion of the tuber surface covered by scab (*Streptomyces scabies*) [cf. **33**, p. 623], though they did cause profuse sporulation on many of the lesions. One application of S (500 or 1,000 lb.) reduced scab, but treatment for 2 successive years was necessary to achieve control, so that the use of S is feasible only where potatoes are grown continuously on the same ground. As excess S reduces yield frequent pH checks are recommended; over the first 2 years sufficient S should be given to reduce pH to 4·5–5, after which smaller annual applications should suffice to maintain the level. Consideration should be given to the points that potatoes are best grown in rotation with a 'sod' at least every 4 or 5 years, that low pH does not favour soil-improving legumes, and that the cost of S would drastically reduce profits.

Bubentsov (S. T.). Актиномикоз Картофеля в центральном Казахстане и борьба с ним. [Actinomycosis of Potatoes in central Kazakhstan and its control.]—Тр. респ. Ст. Защ. Раст. Казахск. фил. ВАСХНИЛ [*Trud. resp. Sta. Zashch. Rast. Kazakh. fil. VASKNIL*], **3**, pp. 192–212, 1956. [Abs. in *Referat. Zh. Biol., 1958*, 14, p. 210, 1958.

The late spring plantings of the potato vars. Record 792 and Karagandinski 958 were severely damaged by scab (93% loss), caused by *Actinomyces* [*Streptomyces*] *globisporus*, *A.* [*S.*] *candidus* (both favoured by 14–22° [C.]), and *A.* [*S.*] *violaceus* (30°); all were favoured by 50–70% soil humidity. Berlinkhingen was resistant. In field tests soil treatment with flowers of S was effective.

Koba (S.). **Wound healings in cultivated plants. I. Wound penetration by the pathogenic bacteria of Potato tuber. II. Oil-drop-like substances emerge in the wound reaction of Potato tubers.**—*Sci. Bull. Fac. Agric. Kyushu*, **16**, 3, pp. 397–401, 1 fig.; pp. 403–410, 4 fig., 1958. [Japanese. Abs. from English summaries.]

When cut pieces of potato tubers were kept at 30° C. and 85–90% humidity wound cork formed on the cut surfaces in 8 days. When cut again and infected with a water suspension of *Erwinia aroideae*, *Pseudomonas solanacearum*, or *Corynebacterium sepedonicum* at 1 hr. intervals, parasitization of the tubers was only slight after 8 hr.

The 2nd paper notes that in parenchymatous tissues below a wounded surface, examined in 50% H_2SO_4, there were substances in the form of oil drops which changed somewhat in the course of 2–12 hr. after wounding. Similar substances were also found round the vascular bundles, by means of which stimulation had apparently been spread from the wound for some distance. Suberization takes place too late to prevent bacterial wound infection.

Hildebrand (E. M.) & Smith (F. F.). **Aphid transmission of a virus associated with Sweetpotato internal cork and masked in feathery-mottle-infected Sweetpotatoes.**—*Plant Dis. Reptr*, **42**, 10, pp. 1148–1153, 1 fig., 1958.

At Beltsville, Maryland, sweet potato internal cork virus was transmitted by *Myzus persicae* [**38**, p. 31] and *Macrosiphum solanifolii* [*M. euphorbiae*] to Porto Rico sweet potato plants in the greenhouse. On the basis of root lesions the efficiency of both insect and graft transmissions was rated at less than 20%, but leaf symptoms indicated that all the inoculated plants had become infected. The same aphids transmitted internal cork virus from a Russian sweet potato clone (P.I. 105945), where it occurred as a masked contaminant with sweet potato feathery mottle virus [loc. cit.]; the latter was not transmitted [cf. **34**, p. 174]. *Myzus persicae* readily transmitted internal cork virus to Scarlett O'Hara morning glory [*Ipomoea bona-nox* × *I. hederacea*: **35**, p. 632], the incubation period being 6–8 days when the source plants were infected only by the one virus and 12 days or more when they also contained feathery mottle.

Visser (T.). **Report of the Acting Pathologist for the year 1957.**—*Bull. Tea Res. Inst. Ceylon* 39, pp. 47–50, 1958.

Field trials during 1956–7 confirmed earlier findings concerning the control of blister blight [*Exobasidium vexans*: **37**, p. 310; **38**, p. 100]. In general the Cu content of the fungicide determines the level of protection, as was demonstrated in an experiment which showed that 8 oz. Bordeaux mixture (2 oz. Cu) was equivalent to 4 oz. perenox (2 oz. Cu), and 4 oz. Bordeaux (1 oz. Cu) to 8 oz. fitox (1 oz. Cu).

Heath (E. D.). **Aerosol spraying.**—*Two & a Bud* (*News Lett. Tocklai exp. Sta.*), **5**, 3, pp. 8–10, 1958.

This paper outlines the principles of aerosol spraying and notes that this has been given intensive field trials on commercial tea estates by the Advisory Branch of the Toklai Experimental Station, Cinnamara, Assam, and has shown great promise. The machine to be adopted ultimately should weigh 30 lb. or less empty and be comfortably carried by harness. The spray tank, of non-corrodable plastic, should hold about 2 gal. The 2-stroke engine, capable of starting easily when hot under tropical conditions, will drive a high-speed centrifugal fan at about 30,000–40,000 r.p.m. to produce a low pressure air stream of about 350 ft./sec. (240 m.p.h.) at the nozzle. The 2-gal. tank will be capable of being emptied in anything from 2 min. to over 1 hr.; normal operating in tea will take about 30 min., during which time the operator should cover some 1,000 tea bushes effectively. Thus a top-spray for blister blight [*Exobasidium vexans*: cf. **37**, p. 738] will be applied at about $\frac{1}{2}$–$\frac{1}{4}$ acre/hr./man, using 5–10 gal. spray fluid/acre. The cost of such a machine, under present market conditions, is expected to be Rs. 1,000–1,500.

Lucas (G. B.). **Tobacco diseases in Panama.**—*Plant Dis. Reptr*, **42**, 11, p. 1301, 1958.

Diseases observed on Burley and native tobacco in Chiriqui province in Nov. 1957 and Jan. 1958 included damping-off (*Pythium* sp.), which, together with frog-eye (*Cercospora* [? *nicotianae*: map 172]) and Granville wilt (*Pseudomonas solanacearum* [map 138]), is serious, brown spot (*Alternaria longipes* [map 63]), southern stem rot (*Sclerotium rolfsii* [map 311]), hollow stalk (*Erwinia aroideae*), and frenching, associated with *Bacillus cereus* [**32**, p. 153]. Virus diseases are tobacco leaf curl [map 147], the most prevalent, tobacco mosaic, and (not positively identified) tobacco etch and veinbanding. Physiological leaf spotting was also observed.

Matsui (C.) & Yamada (M.). **The localization of Tobacco mosaic virus within diseased Tobacco leaf.**—*Ann. phytopath. Soc. Japan*, **23**, 2, pp. 76–78, 8 fig., 1958. [Japanese. Abs. from English summary.]

The distribution of the virus particles in the various cells of a diseased leaf [cf. **38**, p. 34] is illustrated by electron photomicrographs prepared at Nagoya University, Anzyo.

Smirnova (Mme V. A.). Электронномикроскопические наблюдения над частицами вируса Табачной мозаики (ВТМ) внутри клетки больного растения. [Electron microscopy observations of Tobacco mosaic virus (TMV) particles inside the cells of the infected plant.]—*Microbiology, Moscow*, **25**, 6, pp. 718–722, 2 pl., 1956. [English summary.]

At the Electron Microscopy Laboratory of the Soviet Academy of Sciences it was observed that the particles of tobacco mosaic virus in the yellow spots on infected tobacco leaves [cf. **29**, p. 438 and above] were basically analogous to those of isolated virus, but the photographs show structural differences. When trichloroacetic acid was used as a fixative particles were missing, and when 1% osmic

acid in buffer solution was used distribution was unequal but the particles were much more numerous in the pale spots. The semi-transparent matter in the cells is a mass of decomposed plastids with the virus particles grouped around it. Other inclusion bodies of different structure were found.

Hall (C. E.). **Lengths of Tobacco mosaic virus from electron microscopy.**—*J. Amer. chem. Soc.*, **80**, pp. 2556–2557, 1958.

The results obtained at the Dept of Biology, Massachusetts Institute of Technology were in close agreement with earlier findings [**31**, p. 212]. Hydrodynamical data have been published for the same sample (*J. Amer. chem. Soc.*, **80**, p. 2550, 1958).

Fernández-Morán (H.) & Schramm (G.). **The structure of Tobacco mosaic virus as revealed in ultrathin sections by electron microscopy.**—*Z. Naturf.*, **13** B, 2, pp. 68–71, 7 fig., 1958. [German summary.]

In a technique developed at the Max-Planck Institut für Virusforschung, Tübingen, Germany, orientated samples of the virus were obtained by sucking the stiff gel of fresh samples into plastic or glass capillaries (2 mm. internal diam.). Short segments were stained (at 4° C., with various stains), embedded in prepolymerized butyl methacrylate after dehydration in graded concs. of ethanol, sectioned (100–200A), using a Moran ultramicrotome with a diamond knife, and mounted on fenestrated formvar films. The size and configuration of the particles was as in specimens dried directly on the films, and the technique is extremely promising.

Holmes (K. C.) & Franklin (Rosalind E.). **The radial density distribution in some strains of Tobacco mosaic virus.**—*Virology*, **6**, 2, pp. 328–336, 1 graph, 1958.

Calculations at Birkbeck College Crystallography Laboratory, University of London, of the radial electron density in strains U1 and U2 of tobacco mosaic virus, 2 Rothamsted isolates from leguminous plants [**36**, p. 811], and cucumber virus 4 (considered also to be a strain of this virus: cf. R. Kilkson, *Arch. Biochem. Biophys.*, **67**, pp. 53–58, 1957) showed the principal structural features to be common to all strains. The particles have a max. radius of 90A, a hollow core of radius 20A, and similar peaks of nucleic acid and protein densities; the helical array of protein subunits bears 49 subunits in every 3 turns. The strains differ in the relative heights of the peaks in protein density, i.e. in the weights of protein lying at particular radii.

Zaitlin (M.). **Continuous filter paper electrophoresis of Tobacco mosaic virus.**—*J. Chromatogr.*, **1**, 2, pp. 186–199, 2 fig., 1 graph, 1958. [31 ref.]

This paper extends earlier observations (*Biochem. Biophys. Acta*, **20**, p. 556, 1956) [cf. **37**, p. 311].

Shimomura (T.), Nishikawa (Y.), & Imaizumi (T.). **Studies on the chemotherapy for plant virus diseases. III. Effect of thiosemicarbazones on the multiplication of Tobacco mosaic virus.**—*Ann. phytopath. Soc. Japan*, **23**, 2, pp. 65–68, 1958. [Japanese. Abs. from English summary.]

In further experiments [**37**, p. 679] at Nagoya University, Anzyo, both substituted and unsubstituted benzalacetone thiosemicarbazones, and benzaldehyde thiosemicarbazones (unsubstituted) were to some degree effective in inhibiting multiplication of the virus in half-leaves of tobacco floated on solutions under continuous illumination.

Rŷzhkov (V. L.) & Marchenko (N. K.). Влияние катионов некоторых металлов на размножение вируса мозайчной болезни Табака (ВТМ). [The effect of

some metallic cations on the multiplication of mosaic virus in Tobacco (TMV).] —*Microbiology, Moscow*, **26**, 3, pp. 380–385, 1957. [English summary.]

At the Institute of Virology, Moscow, the majority of metals and salts tested [cf. **28**, p. 549] inhibited multiplication of tobacco mosaic virus in isolated tobacco leaves but no correlation was found between toxicity and inhibitory effect, though there was one between toxicity and ability to form complexes with biologically important substances. Na and Ca do not prevent multiplication, and the inhibitory effect of Mg was neutralized by an equimolar conc. of Ca ions.

Ukholina (Mme R. S.). Об инактивирующем действии актиномицетов на вирус Табачной мозаики. [On the inactivating effect of actinomycetes on Tobacco mosaic virus.]—*Microbiology, Moscow*, **27**, 3, pp. 352–356, 1958. [English summary.]

Of 1,737 actinomycete strains active against other organisms tested at the Institute for the Investigation of New Antibiotics, Academy of Medical Science, U.S.S.R., on tobacco mosaic virus in *Nicotiana glutinosa* leaves, 363 (20·9%) inhibited the virus. Of 630 inactive strains 96 (15·2%) were inhibitory in a contact test. From inhibitory strain 2915 heliomycin was obtained, which inhibited TMV and some other viruses *in vitro*.

Troutman (J. L.) & Fulton (R. W.). **Resistance in Tobacco to Cucumber mosaic virus.**—*Virology*, **6**, 2, pp. 303–316, 1 fig., 2 graphs, 1958.

This information has been noticed [**37**, p. 58].

Bortels (H.). **Über Beziehungen zwischen den durch Pseudomonas tabaci (Wolf u. Foster) Stevens hervorgerufenen 'Wildfeuer'-Erkrankungen des Tabaks, Luftdruckänderungen und Solaraktivität.** [On the connexion between 'wildfire' of Tobacco caused by *P. tabaci*, fluctuations in atmospheric pressure, and solar activity.]—*Phytopath. Z.*, **33**, 4, pp. 403–425, 7 graphs, 1958. [English summary.]

In experiments during 1953–57 at the Institut für Bakteriologie, Berlin-Dahlem, it was shown that the virulence of *P. tabacum* [cf. **37**, p. 444] and the extent of wildfire on tobacco leaves were subject to considerable fluctuations running parallel to certain weather changes. When cyclonic disturbances (falling atmospheric pressure) occurred during the preparation of the culture medium, followed by anticyclonic developments (rising pressure) during and after the development of the bacteria, the pathological symptoms were increased. On the other hand they were reduced or suppressed altogether when reverse conditions prevailed at these times.

Crowley (N. C.). **The use of skim milk in preventing the infection of glass-house Tomatoes by Tobacco mosaic virus.**—*J. Aust. Inst. agric. Sci.*, **24**, 3, pp. 261–264, 2 graphs, 1958.

Tomatoes (var. Adelaide Dwarf Red) in 3 glasshouses in South Australia were sprayed at weekly intervals with a 1/5 dilution of skim milk [cf. **23**, p. 55; **24**, p. 6; **25**, p. 27], using a paint spray at a pressure of 60–70 lb./sq. in., 1/20 shirlan A.G. being added to some sprays for the prevention of leaf mould [*Cladosporium fulvum*]. The 1st treatment was made 2 weeks before transplanting from the seed-bed. Infection was estimated both by visual symptoms and by inoculation to *Nicotiana glutinosa* by Yarwood's method [**33**, p. 203]. There were 35% infected plants at 8 weeks and 100% after 16; at no time was there any evidence that the skim milk prevented infection.

However, a test showed that a 1/1,000 dilution reduced by over 50% the number

of local lesions on *N. glutinosa*. Pre-inoculation application of skim milk to *N. glutinosa* affected the production of lesions by tobacco mosaic virus for up to 7 days after treatment, even if the milk was washed off the leaves within 5 min. of application, the effect being greatest on the most conc. inoculum. The evidence indicated that skim milk contains a substance which inhibits the infection of *N. glutinosa* by tobacco mosaic virus.

In one test on seed transmission 18% of the seedlings raised from commercial tomato seed were infected 21 days after sowing. In a sample of this seed no infected embryos, dissected out, were detected, but 35% of the testas were infected, even after thorough surface sterilization with 10% teepol [cf. **37**, p. 269].

It seems that the source of the initial infection of tomato crops in S. Australia by tobacco mosaic virus is the infection of germinating seedlings from the virus-infected testa.

Hack (T.) & Wartenberg (H.). **Untersuchungen des Blattrollens der Tomatenpflanzen.** [Studies on Tomato leaf roll.]—*Phytopath. Z.*, **33**, 4, pp. 385–398, 1958.

Studies at the Institut für allgemeine Botanik, Friedrich-Schiller University, Jena, Germany, showed that tomato leaf roll [**21**, p. 229] is not caused by reduced growth resulting from accumulation of assimilatory products in the leaves. It is ascribed to disproportionate growth of the different parts. Removal of the axillary shoots confines the precursors of growth hormones to the leaves, leading to a disproportionately high conc. and activity of growth substances in the physiologically younger parts of these organs than in the older. There is agreement in the literature that tomato leaf roll is not the symptom of an infectious disease.

Arutyunyan (E. S.). Вредная микофлора древесных пород и кустарников Дубовых лесов южной Армении. [Harmful fungus flora of trees and shrubs in the Oak forests of southern Armenia.]—104 pp., 9 fig., Yerevan University, Yerevan, 1955. Roubles 3.

Following 5 chapters on the botanical-geographical features of the area, the phytopathological characters, the hymenomycetes of oak and hornbeam, climate, and the comparative susceptibility of trees, a list is given, compiled by the Section for Plant Protection at the Armenian Academy of Science, of 127 spp., 12 forms, and 3 vars. identified in the forests of the Kafan Province, U.S.S.R., including the following: *Entomosporium maculatum* [*Fabraea maculata*] on pear, *Clasterosporium carpophilum* on wild cherry and cherry plum, *Pleurotus corticatus* on walnut (1st record for the country), *Septoria pistaciae* on *Pistacia mutica*, *Exoascus* [*Taphrina*] *deformans* [map 192] (very severe) on peach in the Megri region, a new species *Uncinula teterevnikovae* [without a Latin diagnosis] on *Cotoneaster racemiflora*, and *Gloeosporium ampelinum* [*Elsinoe ampelina*: **37**, p. 709] on vine.

Ap Rees (T.). **Cytochrome oxidase in mycorrhizal and uninfected roots of Fagus sylvatica.**—Abs. in *Plant Physiol.*, **33** (*Suppl.*), pp. x–xi, 1958.

The respiration of the fungal sheath of dissected beech mycorrhiza, measured at Purdue University, Lafayette, Indiana, was stimulated by up to 80% by azide, cyanide, and CO, but that of the cores was strongly inhibited by the 1st two and slightly impeded by CO.

Homogenates of the fungal sheath were shown by spectrophotometric methods to contain an active succinoxidase system. Sufficient cytochrome oxidase could be extracted from the sheath to account for at least 30% of its O_2 uptake, but it was not detected by these methods in extracts of core tissue, which did, however, contain some heat-stable reductant of cytochrome-*c* causing interference with the determination of cytochrome oxidase. The same interfering reductant was also

present in extracts of uninfected beech roots, the respiration of which was reduced by 50–70% by cyanide, azide, and CO (the action of CO being reduced by light). Evidently, therefore, cytochrome oxidase is present in uninfected roots (though the reductant precludes its demonstration) and participates in their respiration.

Bidan (P.), Barret (A.), & Mollard (J.). **La conservation des Châtaignes.** [The preservation of Chestnuts.]—*Industr. aliment., Paris*, **75**, 9–10, pp. 659, 661–663, 665–667, 4 graphs, 1958.

In tests at the Station Végétale I.N.R.A., Versailles, in 1956–7 and 1957–8, nuts of the vars. Comballe and Bouche-Rouge were protected for several months against decay by *Sclerotinia pseudotuberosa*, *Phoma endogena* [cf. **34**, p. 495], and *Penicillium* spp. [including *P. crustaceum*: **30**, p. 5] by immersion immediately after harvest in 0·16% sorbic acid for periods up to 8 days. Cost of the treatment, roughly Fr. 3/kg., is regarded as economical in view of the high prices fetched.

Holmes (F. W.). **Recorded Dutch Elm disease distribution in North America as of 1957.**—*Plant Dis. Reptr*, **42**, 11, pp. 1299–1300, 1 map, 1958.

This annual report from the University of Massachusetts, Amherst [cf. **37**, p. 117], gives some 1st records of the disease (*Ceratocystis ulmi*), including Iowa.

Jančařík (V.) & Urošević (B.). **Hromadný výskyt houby Coniothyrium quercinum (Bonord.) Sacc. na semenáčcích Dubu červeného (Quercus rubra L.).** [Heavy attacks of the fungus *C. quercinum* on seedlings of red Oak (*Q. rubra*).] —Abs. in *Preslia*, **30**, 4, pp. 370–371, 1958. [English summary.]

Heavy losses of red oak seedlings caused by *C. quercinum* occurred in Czechoslovak nurseries in the dry weather of June 1957. This is the 1st record of the disease on oak seedlings in Czechoslovakia.

Kozlova (Mme E. I.) & Robÿsheva (Mme Z. N.). Некоторые данные по углеродному и азотному обмену **Pseudomonas boreopolis** и **Bac. asterosporus** и их влияние на рост сеянцев Дуба. [Some data on the carbon and nitrogen metabolism of *P. boreopolis* and *B. asterosporus* and their effect on the growth of Oak seedlings.]—*Microbiology, Moscow*, **27**, 5, pp. 572–576, 1958. [English summary.]

In laboratory experiments by the Biological Soil Faculty, Moscow University, seedlings from acorns inoculated with *P. boreopolis* from the oak rhizosphere, or *Bacillus asterosporus* from forest soil, or mixtures of the two, and sown in sand at 60% humidity were 5–7 cm. larger at 25 days than the untreated, which had narrower and fewer leaves. Those treated with *P. boreopolis* were the strongest and biggest, as the bacterium is better adapted to the oak rhizosphere than *B. asterosporus*.

Kochman (J.). **Zgorzel kory Topoli powodowana przez grzyb Valsa sordida Nitschke i warunki jej występowania w Polsce.** [Bark blight of Poplar caused by *V. sordida* and the conditions under which it occurs in Poland.]—*Roczn. dendrol.*, **12**, pp. 67–103, 14 fig., 1958. [Russian and German summaries. 30 ref.]

A full account is given of the symptoms of bark blight and of the morphology, physiology, pathogenicity, and systematics of *V. sordida* [**37**, p. 187], which infects weakened trees and gains entry by wounds or injured branches. The fungus can either persist on dead tissues or on weakened plant parts, secreting toxins into surrounding tissues and invading these, or become parasitic under conditions which favour its development. It overwinters as mycelium, conidia, or ascospores in infected tree tissues or in seedlings, and is spread by wind or rain. *Leucostoma niveum* (which is less pathogenic), *Valsa ambiens* (saprophytic), and *Eutypa flavovirescens* [*E. flavovirens*] were also recorded on poplar in Poland.

Iyengar (A. V. V.). **Spike disease of Sandal: a retrospect.**—*Indian For.*, **84**, 10, pp. 603–612, 1958.

Stressing that spike disease of sandal [cf. **35**, p. 497] is becoming extremely serious in India, the author suggests that the Union Government should commission an expert to report on the present state of knowledge before setting up the proposed research project for this disease at Bangalore. In a brief review he indicates the need for further work on possible insect transmission and on the significance of the parasitic habit of sandal on the disease: in view of the readiness with which the tree's haustoria penetrate adjacent plants, including those of its own spp., adjacent trees cannot be regarded as independent units.

Tserling (G. I.). Микориза Лиственницы и ее влияние на рост и состояние сеянцев в условиях карбонатных черноземов Заволжья. [Mycorrhiza of Larch and its effect on the growth and condition of seedlings in carbonate black soil (chernozem) of the Trans-Volga districts.]—*Microbiology, Moscow*, **27**, 4, pp. 450–459, 6 fig., 1958. [English summary.]

At the Kuybyshev Agricultural Institute, U.S.S.R., the growth of larch seedlings in carbonate chernozem ceased towards the autumn of the 1st year unless their roots were mycorrhizal. Addition of mycorrhizal soil to similar areas in the steppes proved insufficient for the infection of all seedlings. Acidification of the soil by S raised the percentage of mycorrhizal seedlings from 2 to 65; seed treatment with the bacterial fertilizers azotobacterin and phosphorobacterin and with silicate bacteria increased it to 28·4, additional micro-elements sprayed on the soil raising it to 47–69; and the introduction of a complex of micro-elements, such as B, Mn, Zn, and Mo, increased seedling survival from 35·5–84·2% and the number of mycorrhizal seedlings from 2–96·3%.

Savory (J. G.). **Blue-stain in logs of 'Maracaibo boxwood'.**—Forest Products Research Laboratory (D.S.I.R.), 8 pp., 5 fig., [? 1958. Cyclostyled.]

Following complaints of blue stain in stored, air-dried half logs of Maracaibo boxwood (*Gossypiospermum praecox*) after importation from Venezuela, the author obtained *Lasiodiplodia* [*Botryodiplodia*] *theobromae* as the only staining fungus in isolations, except for *Diplodia natalensis* found on one occasion [**37**, p. 123]. During 5 weeks' storage at 65° C. the stained area may increase from 12·5 to 25%. Steaming 9 in. billets for 4 hr. at 150° F. killed *B. theobromae*, but there was some survival at 140°. The effect of staining on strength is negligible. Storage temp. and moisture content are the determining factors, and the trouble is most likely to develop when importation is followed by a period of warm humid weather. Staining can be avoided by rapid drying of the timber, if necessary by kilning, immediately after arrival; growth of the fungus is probably much reduced or altogether prevented below 50° F. Clean timber can be protected by use of sodium pentachlorophenate immediately after felling. The bark of all logs is likely to be infected with spores. The most severe stain is accompanied by insect attack.

Fougerousse (M.). **Les altérations fongiques des bois frais en Afrique tropicale et plus particulièrement de l'Ilomba et du Limba.** [Changes caused by fungi in green timber of tropical Africa with special reference to Ilomba and Limba.] —*Bois. For. Trop., 1958*, 60, pp. 41–56, 10 fig., 2 graphs, 1958. [English and Spanish summaries.]

Among different forms of wood discoloration not appreciably affecting the physical and mechanical properties of timber there is a staining of freshly felled ilomba (*Pycanthus angolensis*) in French tropical Africa known as 'cow's tail', which is fully described. A violet hue results from blueing due to *Lasiodiplodia* [*Botryodiplodia*] *theobromae* [cf. above] and a red stain is probably caused by *Fusarium*

sp. or *Cylindrocarpon* sp. Another form of 'cow's tail' is a brown discoloration associated at first with the conidial state of a fungus resembling *Thielaviopsis* and later with the perithecia of a *Ceratostomella*, the first fungus to attack newly felled ilomba, though rapidly followed by others. Ilomba felled without serious bark injury can remain on the ground for 4 weeks with little damage, but logs may be protected by spraying with a fungicide, especially if cut up and barked.

In limba (*Terminalia superba*) *Ceratostomella* causes a faint sepia discoloration, which becomes paler after drying, but gives the wood a 'faded' look. A bright, straw-coloured discoloration after felling is due to *Cytospora* sp. Lesions affecting the physical and mechanical properties of local timber are most commonly caused by *Schizophyllum commune*, but may be due to *Lentinus squarrulosus* and other organisms.

Duncan (Catherine G.). **Studies of the methodology of soil-block testing.**—*Rep. For. Prod. Lab., Madison*, 2114, ii+126 pp., 1 fig., 7 graphs, 1958.

The results are given in detail of studies at Madison and other co-operating laboratories during 1950–56 to standardize the soil-block method for accelerated testing of wood preservatives [**32**, p. 226; **34**, pp. 333, 334]. The tests were for the most part done with $\frac{3}{4}$-in. southern pine cubes, conditioned in a room at 70% R.H. and 80° F. for 2 weeks. The points investigated include the dilution of oil-type preservatives with toluene and the factors involved, the relation of the wood species used in tests to the threshold values obtained, the effect of different soils used (uniformity of water holding capacity is the main factor), the effect of aeration through the bottle lids [cf. **37**, p. 688], the tolerance in certain strains of test fungi of particular preservatives and the differences of tolerance [cf. **38**, p. 41] between them, and the application of artificial weathering to simulate natural conditions.

McKnight (T. S.). **Application of the logistic function to toxicity of wood preservatives.**—*For. Prod. J.*, **8**, 3, pp. 96–98, 3 graphs, 1958.

From logistic function graphs of the effectiveness of pentachlorophenol [**37**, p. 689] and of 2 weakly toxic oils, as assessed by the soil-block method [see above], over a broad range of concs. the author concludes that while the threshold value [**34**, p. 334] is of interest in the case of strong fungicides it is of little use for weaker ones. Graphs of logistic function on the other hand, are equally and highly useful for all types of wood-preserving fungicides.

Linnasalmi (A.). **Phytotoxicity of wood preservatives and possibilities of using them in greenhouses and benches.**—*Valt. Maatalousk. Julk.* 166, 40 pp., 14 fig., 14 graphs, 1958. [Finnish summary.]

In tests at the Agricultural Research Centre, Tikkurila, Finland, water-soluble wood preservatives generally caused no injury to plants when impregnated splints were either buried in the soil in the plant boxes or hung in a glass case enclosing plants [cf. **35**, p. 567]. Some damage occurred when splints treated with Boliden or Wolman salts were soaked in water and the extract was sprayed on the plants. Oily and oil-soluble substances were harmless when the treated wood was completely covered by soil but creosote and pentachlorophenol, if allowed to volatilize, caused fading of leaves, necrosis, abnormal glossiness, bulging, drying, stunting, and sometimes rapid death; this damage could be prevented by varnishing the treated surfaces. Cu naphthenate compounds and turpentine caused no injury. Of the plants examined, cucumber, cineraria, and tomato were the most susceptible to injury and cabbage, swede, and cyclamen the least.

Sheridan (T. G.). **A mill survey of wood deterioration and its effect on pulp yield and quality.**—*Pulp Pap. (Mag.) Can.*, **59**, C, pp. 228–235, 1958.

Hitherto unpublished information is summarized from a survey of all the mills

represented on the Mechanical Pulping, Alkaline Pulping, and Sulphite Pulping Committees of the Technical Section of the Canadian Pulp and Paper Association.

All newsprint mills reporting claimed that they did not use decayed wood for groundwood pulp: this is achieved by not storing the wood for more than 1–2 yr., by culling in the bush, sorting in the wood room, and sending all culled wood to the chippers where decayed wood least affects the final quality of the newsprint. Pulpwood infected with *Trametes* [*Fomes*] *pini* need not be culled in the early stages of decay because the fungus attacks the cellulose only in the more advanced stages of rot.

In sulphite pulping the effect of decay on yield and quality depends very much on the type of rot and extent of decay, but in sulphate cooking it varies according to the tree spp. and the fungus spp., experience with Jack pine indicating that with increasing severity of *F. pini* infection pulp yield and strength decrease and the chemical consumption increases. Decay during 1 year's storage of unbarked spruce led to a diminution of both the strength and yield of pulp (sulphite). Rotten chips gave lower mullen, higher tailings, lower yield, and a darker unbleached pulp than sound chips. Results from sulphate pulping of aspen wood chips at various levels of [unspecified] decay indicated that the wood density was affected only in the final stage (serious visible rot). The degree of deterioration as assessed visually was in general not reflected in the properties of the resulting pulps. In similar tests with fresh white birch wood with serious heart rot chemical and bleach requirements were higher, there was a probable drop in mullen, and a significant drop in brightness compared with fresh-cut young or mature birch, while mature birch stored for 14 months required 20% more chemical, gave 10% less yield, and was significantly lower in mullen, tear, and viscosity. Sound spruce sticks stored in ricked (corded) piles for 4 yr. contained no more than a trace of decay which would be expected to cause a decrease in pulp yield, though [unspecified] decay had become established in 18·85% of the volume.

Bremer (H.). **Vektorenbekämpfung bei Viruskrankheiten in Gemüsebau?** [Control of vectors of virus diseases in vegetable growing?]—*Anz. Schädlingsk.*, **31**, 5, pp. 65–67, 1958. [36 ref.]

A discussion of recent literature.

Neergaard (P.). **Mycelial seed infection of certain Crucifers by Sclerotinia sclerotiorum (Lib.) D. By.**—*Plant Dis. Reptr*, **42**, 10, pp. 1105–1106, 1958.

During routine seed testing in Denmark in 1953–58 [cf. **38**, p. 54] mycelium of *S. sclerotiorum* was detected in 23 of 1,045 lots of *Brassica* seed (including cabbage, cauliflower, kale, and swede). No sclerotia were found. It is suggested that dead flower parts may be an important source of seed infection [**37**, p. 611].

Popov (V. I.). Сосудистый бактериоз и устойчивость к нему сортов белокочанной Капусты в условиях Воронежской области. [Vascular bacteriosis and resistance of white Cabbage varieties in the conditions of the Voronezh province.]—*Trud. vsesoyuz. Inst. Zashch. Rast.*, **10**, pp. 166–182, 5 fig., 2 graphs, 1958.

In the Voronezh province, U.S.S.R., vascular bacteriosis (*Xanthomonas campestris*) [**36**, p. 801] is widespread and damage to cabbage plants is extensive. Savinskaya 42, Zavadovskaya 257–263, Marnopolka 1002, Birynchekutskaya 138, Kaporka Odesskaya, and Likurishka 498/15 are resistant. K salts and relatively low soil humidity increase the resistance of plants whereas nitrates and wet soil have the contrary effect.

Anisimov (A. M.). О роли минеральных удобрений и некоторых микроэлементов в повышении устойчивости Капусты к бактериозам. [The role of mineral fertilizers and some micro-elements in the increase of resistance in Cabbage to bacteriosis.]—*J. Kharkov agric. Inst.*, **13**, 50, pp. 127–132, 1957. [Abs. in *Referat Zh. Biol., 1958*, 12, p. 202, 1958.]

In field tests during 1950–52 with the cabbage vars. Brunswick and No. 1, NPK in association with micro-elements decreased vascular bacteriosis [*Xanthomonas campestris*: **38**, p. 43] by a half in Brunswick and considerably decreased soft rot [*Erwinia carotovora*: **38**, p. 43]. The effect on No. 1 was less.

Haudiquet (R.). **Les moyens de lutte contre les parasites de la Betterave.** [Methods of control of Beet parasites.]—*Industr. aliment., Paris*, **75**, 5, pp. 375–379, 1958.

Information is summarized on the control in France of beet yellows and mosaic viruses, rust [*Uromyces betae*], mildew [? *Erysiphe polygoni*: cf. **35**, p. 146], and 'cercosporiose' [*Cercospora beticola*], with special reference to the use of lindane against the aphid vectors of the viruses and of zineb, copper products, or oxyquinoline against the fungi.

Drachovská (Mme M.) & Šandera (K.). **Použití konduktometrických metod ve Fytopatologii.** [The conductometric method in phytopathology.]—Abs. in *Preslia*, **30**, 4, pp. 357–358, 1958. [English summary.]

The reduced resistance to an electric current in diseased or damaged tissue [cf. **36**, p. 207] was used in Prague for the diagnosis of sugar beet yellows and the evaluation of *Cercospora beticola* infection in beet.

Russell (G. E.). **Sugar Beet yellows: a preliminary study of the distribution and interrelationships of viruses and virus strains found in East Anglia, 1955–57.**—*Ann. appl. Biol.*, **46**, 3, pp. 393–398, 1958.

At the Plant Breeding Institute, Trumpington, Cambridge, experimental transmissions by *Myzus persicae* to sugar beet seedlings and to *Chenopodium capitatum* from yellowed sugar beet leaves from commercial fields in East Anglia in the summers of 1955–57 revealed the presence of 2 yellowing viruses. One was sugar beet yellows virus (SBYV) [**37**, p. 613], which produced vein-etch and yellowing symptoms on beet seedlings in the greenhouse; the other, 'sugar beet mild yellowing virus' produced yellowing only [cf. **35**, p. 870]. The 2 viruses appeared to be unrelated, differences being noted in symptomatology, serology, the results of cross-immunization tests, sap from infected plants, and electron microscopic examination.

The 2nd virus decreased the root yield of sugar beets grown under glass by as much as the milder SBYV strains but less than the severe ones. The proportions of the 2 in the samples collected differed from year to year and from place to place. There seems to be no reliable method at present of distinguishing between the symptoms of the 2 viruses on mature plants in the field.

Björling (K.). **Incidence of Beet yellows virus in weeds in Sweden and some notes on differential hosts for strains of the virus.**—*K. VetenskSam. Arsb., 1958*, 2, pp. 17–32, 7 fig., 1958.

In glasshouse tests during 1952–57 at the Institute of Plant Pathology and Entomology, Uppsala, 6 new hosts of beet yellows virus were established: *Dianthus deltoides*, *Spergula arvensis*, *Chenopodium glaucum*, *Sonchus oleraceus*, *Papaver dubium*, and *Claytonia perfoliata*. Of these the last appears suitable as a differential host for virus strains, reacting well even in winter and clearly distinguishing mixed infections with sugar beet mosaic virus. No permanent changes in the virulence

of strains after passage through different weeds or through beet were detected, though a temporary weakening occurred sometimes in the 1st test plant generation after passage through plants other than beet, especially if the virus originated from a host in poor condition.

Analyses of 852 weed plants belonging to 42 spp. and collected from sites where they had good opportunity to be infected by the virus showed that 25 plants in all of *Chenopodium bonus-henricus*, *Senecio vulgaris* [**35**, p. 585], *Sonchus oleraceus*, and *Stellaria media* contained yellows virus, while 38 spp., including 6 that were susceptible in the greenhouse, did not. *C. bonus-henricus*, not hitherto reported as susceptible, retained the virus in the field for at least 2 yr., probably without re-infection. Some of the isolates from weeds reacted positively with antisera against beet yellows virus. In comparison with some strains of known virulence from beet on different test plants isolates from weeds and spinach appeared to contain mild as well as intermediate and severe strains.

Although beet yellows virus was found in only a small number of the weed plants collected, and in the spring only in *C. bonus-henricus* and spinach, infected plants of the winter-annual spp. were found fairly often, and in a mild winter may act as significant virus reservoirs in addition to those already known.

Björling (K.) & Ossiannilsson (F.). **Investigations on particles found in plants infected with Beet yellow-net virus.**—*K. LandtbrHögsk. Ann.*, **24**, pp. 77–87, 4 fig., 1 graph, 1958.

At the Institute of Plant Pathology and Entomology, Uppsala, Sweden, short rods, about 300×32 mμ, assumed to be units of particles of beet yellow net virus [cf. **35**, p. 585], were found in low numbers in the precipitate after high-speed centrifugation of diluted leaf exudates obtained by the Johnson method [**30**, p. 403]. Some longer rods of lengths indicating multiples of 2, 3, and 6 of the units were also present, more often after low-speed centrifugation and in uncentrifuged exudates from parenchymatous leaf cells near the veins. The rod-like particles of beet yellow net virus, which morphologically are quite different from the filiform particles of beet yellows virus [**37**, p. 386], seem to occur in a very low conc. in the plant sap.

Giardini (A.). **Gli anticrittogamici nella lotta contro la Cercospora della Barbabietola da Zucchero.** [Fungicides for the control of *Cercospora* of Sugar Beet.] —*Ital. agric.*, **95**, 6, pp. 308–313, 1958.

In field experiments on the control of *C. beticola* [cf. **37**, pp. 61, 126; **38**, p. 111] in a heavily infected area of Italy from 1953–57 the average weights of sugar beet roots for the 5 years (untreated = 100) were: ziram or zineb, 108; Cu salts+ziram or zineb (4 years only), 109; Cu products, 110; tin triphenylacetate (20% active material), tested in 1957 only, 121 for 1·8 kg./ha./application and 123 for 3 kg. [**37**, p. 394].

All the Cu products gave similar results, irrespective of their composition (sulphate, oxychlorides, or oxides) and formulation (dust, wettable, or emulsion), and there was no appreciable difference between the various thiocarbamates of Zn, which were on the whole less effective, but the superiority of the former, greatest in wet years, decreases until finally it disappears in dry ones. There was no evidence of synergistic action in the mixed products. The plants treated 3 times with tin triphenylacetate developed no leaf infection up to the end of Sept.

Meier (E. R.). **Sortenversuche mit Futterrüben.** [Varietal trials with Fodder Beets.]—*Mitt. schweiz. Landw.*, **6**, 2, pp. 17–23, 8 fig., 1958.

In this report on further varietal trials of introduced fodder beets [**35**, p. 501] at the Eidgenössische Landwirtschaftliche Versuchsanstalt, Zürich-Oerlikon, Switzerland,

from 1955–57, inclusive, 8 vars. were rated for resistance to *Cercospora* [*beticola*: loc. cit.] as follows: Triumph 4·2, Zentaur 4·2, Hollandia 4·3, Corona 4·1, Pajbjerg Korsroe 4·1, Barres Kostelecka 4·2, Udyckie Polenkrowe 3·7, and Oetofte Gelbe 4·3, the best rating being 5 and the poorest 1.

Harrison (D. E.). **Downy mildew of Beet in Victoria.**—*J. Agric. Vict.*, **56**, 10, pp. 675–677, 3 fig., 1958.

There is strong evidence that downy mildew (*Peronospora schachtii*) found (on silver beet and beetroot) for the first time in Victoria [cf. **15**, p. 193; map 28], in the Melbourne area, was introduced with infected seed.

Kocková-Kratochvílová (Anna), Kutkova (Marta), & Petrova (Margita). **Druhy rodu Fusarium, ktore sposobili srdiečkovú hnilobu Cukrovej repy v r. 1956 na Slovensku.** [The genus *Fusarium*, which caused heart rot in Sugar beet in 1956 in Slovakia.]—*Čes. Mykol.*, **12**, 2, pp. 83–94, 3 fig., 1958. [Russian and German summaries.]

Studies by the Slovak Academy of Science in 4 regions of Slovakia to identify the causal agent of sugar beet heart rot resulted in the isolation of 15 spp. of *Fusarium*, of which *F. culmorum* represented 21·4%, *F. sambucinum* and *F. solani* 18·5%, and *F. caeruleum* 10%. Their distribution is described.

Khariton (E. G.) & Geller (I. A.). Об антагонистических взаимоотношениях между некоторыми специфическими микроорганизмами Сахарной Свёклы. [On the antagonistic relationship between certain micro-organisms of Sugar Beet.]—*Microbiology, Moscow*, **27**, 1, pp. 95–98, 1 pl., 1958. [English summary.]

At the All-Union Scientific Research Institute for Sugar Beet, Kiev, U.S.S.R., *Bacillus mesentericus* (culture No. 5, isolated from the sugar beet rhizosphere) proved especially antagonistic to the fungi causing black leg (*Phoma betae*) [**34**, p. 763] and storage rot (*Botrytis cinerea* [loc. cit.] and *Moniliopsis*), and *Fusarium* sp. Beet seed treated with culture 5 and sown in small plots gave 12–35% more healthy plants than untreated. When sugar beet roots were treated with culture 5 together with *B. cinerea* rotting was reduced from 15·3% (*B. cinerea* alone) to 6%, untreated uninoculated roots having 9·3% rot.

Kim (W. S.) & Hagedorn (D. J.). **Studies with virus incitants of Pea streak.**—Abs. in *Phytopathology*, **47**, 9, p. 526, 1957.

On the basis of symptomatology and host reaction 47 virus isolates from pea streak in different parts of U.S.A. were classified [at the Dept of Plant Pathology, Wisconsin] into 5 groups. One characteristic isolate from each was studied in detail. I(daho)-5 was similar to Wisconsin pea streak virus but differed in host range, temp. effects, and ageing *in vitro*; I-7 was similar to lucerne mosaic virus but differed in producing a yellow-bordered red mottle on soybean, inciting local lesions on tobacco, and having higher dilution and thermal end-points; M(innesota)-S had a dilution end-point above $1/10^6$ and produced characteristic pea streak; V-III (Wisconsin) from severe streak resembled str. 14 of cucumber mosaic virus but differed in symptoms on cowpea, host range, and physical properties; and an isolate from New York rarely incited streak in the greenhouse but caused tip blight of peas and Crotalaria.

Wetter (C.) & Quantz (L.), **Serologische Verwandtschaft zwischen Steinkleevirus, Stauchevirus der Erbse und Wisconsin pea streak-Virus.** [Serological relationship between Sweet Clover virus, Pea stunt virus, and Wisconsin Pea streak virus.]—*Phytopath. Z.*, **33**, 4, pp. 430–432, 1958. [English summary.]

Serological evidence obtained at the Institut für Landwirtschaftliche Virus-

forschung, Brunswick, showed that a virus from sweet clover (*Melilotus alba*) [**36**, p. 532], Wisconsin pea streak virus [**37**, p. 748], and the I–5 isolate of Idaho pea streak virus [see above] are all closely related. The relationship to a German pea stunt virus [**37**, p. 748] is more distant and further examination is required to elucidate the connexion of the latter with Wisconsin pea stunt virus.

Sherwood (R. T.). **Aphanomyces root rot of garden Pea.**—*Diss. Abstr.*, **18**, 3, pp. 751–752, 1958.

At the University of Wisconsin, Pride peas grown in pots of soil infested with *A. euteiches* [**34**, p. 829] for 51 days with normal watering or for 33 days with heavy daily watering did not differ in disease index, nor did temp. (24 days at 28° C., 27–35 days at 24°, and 34–55 days at 20°) affect the indexes. One part infested soil in 9 of uninfested induced severe root rot; with 1 in 99 it was moderate. In 1955 61 fields were examined before harvest, 55 in 1956, and 42 in 1957; on the basis of greenhouse indexes fields safe for planting were rated 0–50, questionable fields 51–69, and dangerous ones 70–100. *A. euteiches* oospores were absent from soils with indexes 0–49 and present, with 2 exceptions, in all soils of 55–100. In the wet season of 1957 av. yields were lower in severely infested fields than in 1955 and 1956. Late maturing vars. were most affected; withholding peas from dangerous areas is the only dependable control measure [cf. loc. cit.].

The fungus was isolated from roots by trapping zoospores on boiled maize kernels; their discharge was increased in NaCl, $MgSO_4$, and sucrose solutions, compared with tap water; secondary swarming was inhibited at 32°. Growth in agar or liquid media in equilibrium with mixtures of air and N was more rapid with 5% O than with air, slow with 1% O, and nil in its absence. Addition of yeast extract to glutamic acid-cysteine-glucose media increased growth.

Most legumes were slightly to moderately susceptible to root rot, while flax, red-root pigweed [? *Amaranthus retroflexus*], and spinach were mildly parasitized. Oospores in roots survived 6 months alternate freezing and thawing, or continuous freezing in dry, moist, or saturated soils. The fungus grew saprophytically into autoclaved soils at various moistures, but failed to grow in unautoclaved soil. It utilized pea and wheat straw and roots sterilized with propylene oxide but not barley or rye roots. It apparently did not colonize soils amended with pea or wheat straw or fresh pea shoots. Growth was inhibited by 1 p.p.m. actidione, 0·1 p.p.m. oligomycin, and 10 p.p.m. filipin, but not by streptomycin or griseofulvin.

Herzmann (H.). **Biochemische Untersuchungen über den Stoffwechsel gesunder und brennfleckenkranker Bohnen. I. Untersuchungen über Kohlenhydrate, Stickstoffverbindungen, Carbonsäuren und einige Oxydationsenzyme.** [Biochemical studies on the metabolism of healthy and anthracnose-diseased Beans. I. Studies on carbohydrates, nitrogen compounds, carboxylic acids, and some oxidation enzymes.]—*Phytopath. Z.*, **33**, 4, pp. 349–370, 7 fig., 5 graphs, 1958. [English summary.]

At the Institut für Phytopathologie, Aschersleben, Germany, leaves of Kora beans (*Phaseolus vulgaris*) naturally infected with *Colletotrichum lindemuthianum* [**4**, p. 456], analysed by titration and paper chromatography, contained higher sugar and N, the rise being specially marked in the free amino acid fraction. In infected fruits and stems, however, sugar and N were less. Diseased fruits contained citric acid in addition to malic acid.

Diseased plants possess higher phenoloxidase and peroxidase activity at all stages of development but a lower ascorbic-acid oxidase activity.

Skotland (C. B.). **Bean pod mottle virus of Soybeans.**—*Plant Dis. Reptr*, **42**, 10, pp. 1155–1156, 1958.

The virus was found in naturally infected soybeans [**37**, p. 754] in eastern N. Carolina

and southeastern Virginia in 1955. All soybean vars. inoculated mechanically in the greenhouse developed a chlorotic mottle and plants of F.C. 33123 were severely stunted. The cowpea vars. Black and Purple Hull were susceptible but Dixie Lee was resistant. Other susceptible hosts, not previously recorded [**28**, p. 2], were annual and perennial *Lespedeza*, *Stizolobium deeringianum* [*Mucuna deeringiana*], and crimson clover. The virus was not transmitted in soybean seed.

Nováková-Pfeiferová (Mme J.). **Nova houbova choroba Soji u nás.** [New fungus disease of Soybean in our country.]—Abs. in *Preslia*, **30**, 4, p. 369, 1958. [English summary.]

In 1955 *Ascochyta sojaecola* [**33**, p. 462] was recorded in the Braníšovicích and Kroměříži regions of Moravia, for the 1st time in Czechoslovakia.

Erwin (D. C.) & Snyder (W. C.). **Yellowing of Garbanzo Beans.**—*Calif. Agric.*, **12**, 11, pp. 6, 16, 2 fig., 1958.

A note comparing the patch incidence and symptoms of the soil-borne *Fusarium* wilt of *Cicer arietinum* (*F. lateritium* [*Gibberella lateritia*] f. *ciceri*) [**38**, p. 113] with the scattered incidence of the aphid-transmitted virus yellowing, in the causation of which the bean yellow mosaic virus is stated to be a dominant factor, though other aphid-transmitted viruses, including pea enation [mosaic] and alfalfa [lucerne] mosaic, also infect this host in California. *Fusarium* wilt can be spread in pieces of root or stem, and the surface of the seed may become infected during threshing. It is recognized by the discoloration of the stele in contrast to the discoloration under the bark in virus disease.

Erwin (D. C.). **Verticillium wilt of Cicer arietinum in southern California.**—*Plant Dis. Reptr*, **42**, 10, p. 1111, 1958.

This wilt, caused by *V. albo-atrum* [**36**, p. 445], has been seen occasionally in Los Angeles county since 1954. Infection developed in plants inoculated by dipping the roots in a spore suspension but not in those grown in infested soil, indicating that some injury may be necessary for the natural wilt to occur.

Hennebert (G. L.). **Le Botrytis globosa Raabe sur Allium ursinum en Belgique. Morphologie du conidiophore.** [*B. globosa* on *A. ursinum* in Belgium. Morphology of the conidiophore.]—*Bull. Jard. bot. Brux.*, **28**, 2, pp. 193–207, 1 pl., 8 fig., 3 graphs, 1958. [13 ref.]

In the spring of 1957 leaves of *A. ursinum* growing in 4 different localities in Belgium developed wet-rot lesions caused by *B.* [*Sclerotinia*] *globosa* [cf. **33**, p. 463], not previously reported in the country. In one instance infection was furthered by a simultaneous attack of *Caeoma allii-ursini*, 30% of the spots due to *S. globosa* coinciding with coronae of aecidia of *C. alii-ursini*, which also attacked independently. The pathogenicity of *S. globosa* was confirmed. A detailed account is given of the morphology of the conidiophore and of spore production.

Esau (Katherine). **Phloem degeneration in Celery infected with yellow leaf roll virus of Peach.**—*Virology*, **6**, 2, pp. 348–356, 13 fig., 1958.

The phloem degeneration induced in celery at the Dept of Botany, University of California, Davis, by inoculation with peach yellow leaf roll virus [strain of peach western X disease virus: cf. **36**, p. 106] was followed by a pronounced wound healing reaction round the areas of necrosis.

Van Nostram (F. E.). **Effects of fungicide combinations on control of Celery early blight.**—*Plant Dis. Reptr*, **42**, 10, pp. 1107–1110, 1958.

At the Everglades Experiment Station, Belle Glade, Florida, dyrene+tribasic

copper sulphate ($1\frac{1}{2}$ lb.+3 lb.) or+parzate (1+1) were additive in their effects against a severe attack of *Cercospora apii* on Utah 52–70 celery [**37**, p. 701] in 1957, 14 applications, each 56–170 gal./acre, being made at intervals of 3–6 days. In all, 8 fungicides were tested singly or combined. Tank-mix zineb (nabam+$ZnSO_4$, 2 qt.+$\frac{3}{4}$ lb.) was the best of the treatments tested (disease rating 1·8, control 8·1) and more effective than the parzate formulation of zineb (3·9).

Schnathorst (W. C.) & Bardin (R.). **Susceptibility of Lettuce varieties and hybrids to powdery mildew (Erysiphe cichoracearum).**—*Plant Dis. Reptr*, **42**, 11, pp. 1273–1274, 1958.

In a variety trial in the Salinas Valley, California, in 1954 all the crisp type lettuces were susceptible to *E. cichoracearum* [**37**, p. 129], which caused heavy infection over the whole planting, whereas resistance was found in the 'butterhead' types Arctic King and Big Boston, the non-heading 'butter' type Salad Bowl, and a red leaved cos-type Bath Cos. The reaction of 46 lettuce vars. to the disease is tabulated.

Schnathorst (W. C.), Grogan (R. G.), & Bardin (R.). **Distribution, host range, and origin of Lettuce powdery mildew.**—*Phytopathology*, **48**, 10, pp. 538–543, 2 fig., 1 graph, 1 map, 1958.

In further studies at the University of California, Davis, and the Monterey County Dept Agric., California [see above], it was noted that the 1st authentic report of *Erysiphe cichoracearum* on lettuce in the U.S.A., in 1940 (*Plant Dis. Reptr*, **25**, p. 74, 1941), referred to the infection of a wild lettuce hybrid by a wild lettuce strain of the pathogen in the Salinas Valley [cf. **34**, p. 204]. The disease is now fairly widespread in California and is also found in Arizona, but is not validly reported elsewhere in the U.S.A. The strain on cultivated lettuce which appeared in the Salinas Valley in 1951 differs physiologically from the original wild strain, being more sensitive to high temps., and host range studies and other observations suggest it to be a mutant.

Elenkov (E.). Болести по Пипера и борбата с тях. [Diseases on Sweet Pepper and their control.]—Овощарст. и Градинарст. [*Ovoshtarst. & Gradinarst.*], *1958*, 4, pp. 43–46, 1958.

A review of *Verticillium* wilt (*V. albo-atrum*) [**37**, p. 435], stolbur virus [**38**, p. 74], very widespread in N. Bulgaria since 1954, with up to 80% loss in peppers [*Capsicum* sp.], and 'woodiness' caused by cucumber mosaic virus, noticed only in regions where capsicums are grown near cucumber, pumpkin, and melon fields. Detailed descriptions of the diseases are given with recommendations for their control. To prevent stolbur infection the spacing should be 60/15 cm. in most districts but in places with widespread stolbur and wilt 60/10 cm. spacing proved the best. In plots with 60/20 cm. spacing and 2 plants/hole wilt decreased by 30·35% and yield increased by 39·5% compared with plots with the same spacing but only 1 plant/hole.

Control of *Hyalesthes obsoletus* resulted in 30% decrease of stolbur in all regions in N. Bulgaria. Irrigation at 6–7 days, keeping soil humidity at 80–85%, gave the best control of wilt. Spraying with 0·2% malathion before harvest at 7–10 day intervals decreased cucumber mosaic virus.

Winfree (J. P.) & Simons (J. N.). **Titration of Potato virus Y by aphid transmission as affected by leaf development and supply of manganese.**—*Virology*, **6**, 2, pp. 540–544, 1958.

The titre of potato virus Y in California Wonder pepper (*Capsicum frutescens*) seedlings growing in nutrient solution, as measured by transmission by individuals

of *Myzus persicae* after 15–20 sec. feeds, was found at the Everglades Experiment Station, Florida, to increase as the leaves enlarged. Restricting the supply of Mn apparently reduced the rate of virus multiplication, but did not affect the final titre.

Smith (R. W.) & Crossan (D. F.). **The taxonomy, etiology, and control of Colletotrichum piperatum (E. & E.) E. & H. and Colletotrichum capsici (Syd.) B. & B.**—*Plant Dis. Reptr*, **42**, 10, pp. 1099–1103, 1 fig., 1958.

C. piperatum [*Glomerella cingulata*] sometimes causes losses of over 50% (but more often less than 5%) in sweet pepper (*Capsicum frutescens*) fields in Delaware. The fungus can overwinter in plant debris in the soil for at least 9 months as stromata containing embedded conidia; both fungi survived for the same period on dry seed from infected fruit. At Newark 3 applications of zineb or maneb, both 2 lb./100 gal., at 14-day intervals starting 4 weeks after flowering, reduced the percentage infected fruits on Caldel plants inoculated with spore suspensions of *Colletotrichum capsici* from 92 (untreated) to 17·3 and 19·6, respectively, and with *G. cingulata* from 71·4 to 17·85 and 13·92 [cf. **37**, p. 620].

In inoculation tests only Italian El and the 'hot' vars. Cascabella and Mexican Chilli were moderately resistant to both diseases in greenhouse and field.

Nuttall (V. W.) & Jasmin (J. J.). **The inheritance of resistance to bacterial wilt (Erwinia tracheiphila (E. F. Sm.) Holland) in Cucumber.**—*Canad. J. Pl. Sci.*, **38**, 4, pp. 401–404, 1958.

At the Canada Dept Agric. the resistant var. P.I. 200818, the susceptible vars. Marketer, Ottawa 579–205–3, and Wisconsin SMR 12, the F_1 and F_2 progenies of these × P.I. 200818, and the B_1 (backcross to Marketer) were studied for their reaction to *E. tracheiphila* [**36**, p. 306]. A bacterial suspension was injected under the upper epidermis of one cotyledon at the first true leaf stage; the seedlings were then kept at 70–95° F. and plant counts made at 4–6 day intervals. During periods of bright sunny weather symptoms appeared 10–12 days after inoculation, dull weather delaying their appearance by as much as 2 weeks. The results showed that resistance in P.I. 200818 is due to a single dominant gene.

Staněk (M.). **Morění semen Okuren fytostreptem (preparátem streptomycinu a terramycinu) proti Pseudomonas lachrymans (Smith et Bryan) Carsner.** [Treatment of Cucumber seed with fytostrept (streptomycin plus terramycin) against *P. lachrymans*.]—Abs. in *Preslia*, **30**, 4, p. 367, 1958. [English summary.]

Soaking cucumber seeds in 0·05–0·4% fytostrept (250:1,000 p.p.m.) for 1·5–6 hr. was successful against *P. lachrymans* and stimulated seedling growth [cf. **35**, p. 654].

Sleeth (B.). **Cladosporium on Melons in South Texas.**—*Plant Dis. Reptr*, **42**, 10, p. 1104, 1958.

C. cucumerinum was associated with a widespread crown blight of watermelons and cantaloupes [cf. **37**, p. 198] in 1958 and was found on the nets of apparently healthy cantaloupes in the field and in the Weslaco Substation variety trial planting.

Bugnicourt (F.). **Contribution à l'étude de Cladosporium colocasiae Sawada.** [A contribution to the study of *C. colocasiae*.]—*Rev. Mycol., Paris*, **23**, 2, pp. 233–236, 1 pl., 1 fig., 1958.

In New Caledonia *C. colocasiae* [cf. **6**, p. 118; **11**, p. 763; **20**, p. 514] is frequently present in plantings of *Colocasia* [*esculentum* var.] *antiquorum*, which is grown in irrigated terraces on steep hillsides, along streams, or in damp, low-lying areas. Numerous circular spots up to 5 mm. diam. develop, particularly on the older leaves;

the lesions become confluent, more or less extensive, irregular, and finally may cover almost the entire blade. On the upper surface they are Havana green, later yellow; on the lower, they are pale Havana to pale fawn. The fungus, as observed *in vivo* and *in vitro*, is described in detail. Fungicidal spraying is impracticable in native plantings. Spotted leaves should be removed and burnt and a suitable fertilizer applied.

Gromov (N. G.). Шампиньоны. [Mushrooms.]—167 pp., 50 fig., 2 graphs, State Publishers of Agricultural Literature, Moscow, 1957. Roubles 1.95.

A book on mushroom growing based on the experience of the Scientific Research Institutes and State Farms and on foreign information, including a section (pp. 152–163) on diseases and their control.

Bisson (J.) & Larrieu (G.). **Pépinières et fongicides récents.** [Nurseries and recent fungicides.]—*Progr. agric. vitic.*, **75**, 21, pp. 234–239, 1958.

Comparative tests in 1957 by the Centre de Recherches Agronomiques du Sud-Ouest at the Bahus-Soubiran vine nursery, Landes, France, against downy mildew [*Plasmopara viticola*: **37**, p. 630] showed that at the dosage recommended by the manufacturers a zineb–copper compound (15% zineb and 37·5% Cu) at 4% and 50% captan at 0·25% were as good as and sometimes slightly superior to 1·5% Bordeaux. Treatment began on 15 June and was repeated, depending on weather conditions, roughly twice weekly until 15 Oct., 34 applications in all.

Kuchaeva (Mme A. G.). Применение антибиотиков в борьбе с мильдью Виноградной лозы. [The use of antibiotics for the control of mildew on Vine.]—*Microbiology, Moscow*, **27**, 3, pp. 348–351, 1958. [English summary.]

In laboratory tests at the Microbiological Institute, Academy of Sciences, U.S.S.R., streptomycin, penicillin, terramycin, laevomycin, biomycin, and other antibiotics, including that from actinomycete 2739, applied to the soil at 100 units/ml. and to leaves of the vine grafts inoculated with *Plasmopora viticola* [**38**, p. 54] penetrated into the plant; penicillin and antibiotic from 2739 inhibited fungal growth and sporangial formation, with no adverse effects on the host, and also protected the plant from infection.

Dead arm disease of Grapes.—*Agric. Gaz. N.S.W.*, **69**, 8, pp. 413–415, 3 fig., 1958.

Dead arm (*Phomopsis* [*Cryptosporella*] *viticola*) [cf. **37**, p. 696], first recorded in N.S.W. in 1928, has only recently been considered as potentially serious there, becoming of some consequence in cool, wet springs. In 1956 it caused widespread infection of the vars. Waltham Cross and Cornichon in the Murrumbidgee Irrigation Areas; elsewhere Grenache was particularly affected and Black Muscat less so. Sodium arsenite, 1 qt./30 gal., and captan [**37**, p. 390], 1 lb./40 gal., are under trial in N.S.W. for control.

Resplandy (Renée). **Les maladies parasitaires des principales cultures tropicales. Revue bibliographique. XXI.** [The parasitic diseases of the principal tropical crops. Bibliographical review. XXI.]—*Rev. Mycol., Paris*, **23**, 2, pp. 237–256, 1958. [135 ref.]

Further notes in this series [**37**, p. 331] are based on world literature published mainly during 1956–7.

Thirty-eighth Annual Report, Department of Agriculture, California, for the period ending 31 December, 1957. Bureaux of Plant Pathology and Plant Quarantine. —*Bull. Dep. Agric. Calif.*, **47**, 2, pp. 172–190, 3 fig., 1 map; pp. 190–197, 2 fig., 1958.

The plant pathology section includes an account of the annual disease surveys [cf.

37, p. 206] by D. W. Nichols, T. R. Carpenter, & D. Y. Rosenberg. Club root (*Plasmodiophora brassicae*), of limited distribution in the State, was found on sweet alyssum (*Lobularia maritima*) in a cold frame in Monterey county; appropriate eradication measures were applied. New reports of *Phymatotrichum omnivorum* on cotton bring the total of infested properties in the Imperial Valley to 21. The disorder of Olallie blackberries previously reported [loc. cit.] has now been identified (by S. Wilhelm) as the logan dwarf virus disease [blackberry dwarfing virus: **28**, p. 225]. The virus-like disease of sweet potato already described [**36**, p. 8; **38**, p. 31], now referred to as 'yellow dwarf', was again found in the San Bernardino and Riverside counties.

H. Schlocker states that the decrease in the number of new tree cases of yellow leaf roll [str. of peach western X: **38**, p. 16] virus infection of peach from 1,029 in 1951 to 56 in 1957, when only 16 properties were affected, brings the incidence to its lowest point since the suppression project was begun.

The report from the plant pathology laboratory (C. G. Weigle, A. M. French, & T. G. Scandone) includes the following records of unusual interest: crown gall (*Agrobacterium tumefaciens*) on *Artemisia* sp. from Missouri, *Armillaria mellea* killing *Salix babylonica* in a parkway planting, and branch die-back of Chinese elm (*Ulmus parvifolia*) caused by *Verticillium albo-atrum*, all apparently new host records; *Corynebacterium fascians* causing severe stunting and fasciation of *Pelargonium domesticum* [cf. **37**, p. 4]; and *Fusicladium* sp. causing a previously unreported leaf spot or scab disease on *Raphiolepis indica* in a wholesale nursery.

The plant quarantine section is presented, as before, by A. P. Messenger & E. A. Breech.

Tempany (Sir H.) & Grist (D. H.). **An introduction to tropical agriculture.**—xvi +347 pp., 12 pl. (4 col.), 3 fig., 3 maps, London, Longmans, Green & Co., 1958. 40*s*.

This book, which is of general interest to plant pathologists, is divided into 3 parts, of which the 1st (pp. 3–84) covers the tropical background, the 2nd (pp. 87–258) deals with agricultural practice in the tropics, and the 3rd (pp. 261–313) with economic considerations. Chapter 12 (pp. 183–204) is devoted to pests and diseases and their control.

Vasil'eva (Mme V. P.) (Editor). Шкідники і хвороби сільськогосподарських рослин. [Pests and diseases of agricultural plants.]—491 pp., 5 col. pl., 194 fig., State Publishers of Agricultural Literature, Ukrainian S.S.R., Kiev, 1956. Roubles 8.50. [5 pp. ref.]

This book, intended for the specialist, deals with methods for the control of pests (principally) and diseases, fungicides, fumigants, and chemical compounds, machines for their application, control from the air, and organization of control measures, followed by chapters with detailed descriptions of diseases on different plants (vegetables, fruits, and trees).

Bassi (A.). **Del mal del Segno.** [The mark disease.]—Translated by P. J. Yarrow. Edited and with an Introduction by G. C. Ainsworth & P. J. Yarrow. 49 pp., 2 pl. Baltimore, Maryland, Monumental Printing Co. for the American Phytopathological Society (Phytopathological Classics No. 10), 1958. [Obtainable from Paul H. Wooley, Dept of Plant Pathology, Cornell University, Ithaca, N.Y.] $1.25.

This is an English translation of Bassi's monograph, published in 1835, elucidating the etiology of the muscardine disease of silkworms caused by *Beauveria bassiana*; a work which had an important influence on the beginnings of plant pathology.

Grainger (T. H.). **A guide to the history of bacteriology.**—xi+210 pp., New York, Ronald Press Co., 1958. $4.50.

This useful book starts with a list of general reference works (bibliographies, abstracting journals, source books, etc.) which touch on bacteriology, followed by a classified list of sources dealing more specifically with the subject, including abstracting journals, catalogues, proceedings of congresses and societies, dictionaries, etc., and references to immunology and Russian literature. The historical section which follows includes titles of publications on actinomycetes, air, autotrophic bacteria, classification, ecology, enzymes, epidemiology, germ-free techniques, bacteria associated with insects, marine bacteriology, plant diseases (pp. 109–110, 13 ref.), soil, staining, and veterinary bacteriology.

There is a short list of general biographical references, followed by a selective guide to literature on the lives and work of 60 outstanding bacteriologists.

Most of the entries are provided with brief notes on the scope and value of the information and there is a comprehensive author and subject index.

Goto (M.) & Okabe (N.). **Cellulolytic activity of phytopathogenic bacteria.**—*Nature, Lond.*, **182**, 4648, p. 1516, 1958.

At Shizuoka University, Iwata, Japan, various isolates of 13 species of *Pseudomonas*, 7 of *Xanthomonas*, 2 of *Erwinia*, 1 of *Agrobacterium*, and 1 of *Corynebacterium* were tested for cellulolytic enzymes by means of stab cultures on a carboxymethylcellulose gel incubated for 3 weeks at 30° C. To prepare the medium 2% of carboxymethylcellulose (Koss Chem. Co., Ltd., Tokyo) was dissolved in hot basal medium (70°), such as bouillon, potato decoction, or synthetic solution A.

Bouillon and potato decoction cultures were liquefied in 3–5 days, though the process was very slow in synthetic media, which were only partially liquefied by some isolates even after 3 weeks.

The results obtained from potato decoction gel cultures demonstrated that cellulolytic enzymes are produced by *P. setariae*, *P. solanacearum*, *X. campestris*, *X. citri*, *X. nigromaculans*, *X. oryzae*, *X. pisi* (a new species, not reported), *X. pruni*, *X. vesicatoria*, *E. carotovora* (including *E. aroideae* as a synonym), *E. milletiae*, and *C. sepedonicum*.

Klein (R. M.). **The activation of metabolic systems during crown gall tumor-cell formation. Activation of metabolic systems during tumor-cell formation.**—*Proc. nat. Acad. Sci., Wash.*, **43**, 11, pp. 956–960, 1 graph, 1957; **44**, 4, pp. 350–354, 1 fig., 1 diag., 1958.

The method used at the New York Botanical Garden to induce characteristic slow-growing tumours of *Agrobacterium tumefaciens* in carrot phloem tissue is described; they result from incomplete fulfilment of the conditioning, induction, or promotion stages [cf. **35**, p. 514; **37**, p. 572 *et passim*], probably as a result of metabolic deficiencies. The results are discussed.

The 2nd paper deals with attempts to activate or retard these processes and the interpretation of results.

Ark (P. A.) & Schroth (M. N.). **Use of slices of Carrot and other fleshy roots to detect crown gall bacteria in soil.**—*Plant Dis. Reptr*, **42**, 11, pp. 1279–1281, 3 fig., 1958.

At the University of California, Berkeley, visible tumours appeared within a week or so on slices of carrot buried in soil inoculated with 6 strains of *Agrobacterium tumefaciens* [cf. **35**, p. 167] from different hosts. Rutabaga, turnip, and table beet reacted similarly to inoculation *in vitro* but the galls developed less readily than on carrot.

Sykes (G.). **Disinfection and sterilization.**—xviii+396 pp., 7 pl., 17 fig., London, E. & F. N. Spon Ltd., 1958. 75*s*.

Although this comprehensive treatise has a bacteriological bias—methods for antifungal testing of disinfectants and antiseptics being very briefly dealt with (pp. 64–66, 73–75)—it contains much of interest to applied mycologists. The 6 parts deal with the theory of disinfection and methods of testing, methods of sterilization (by heat, radiation, filtration, gases, cold, etc.), air disinfection and sterilization, disinfection of viruses, chemical disinfectants, and preservation and preservatives. Each section is adequately documented and in conclusion there are author and subject indexes.

Martin (H.). **Guide to the chemicals used in crop protection. Third Edition.**—Pp. 1–306, S1–S9, +34 unnumbered (index), London, Ontario, Science Service, Canada Dept Agric., 1957. $2. **Supplement 1.** Pp. S7–S43, 1–13 (Additions and errors), +7 unnumbered (index), 1958. [Mimeographed.]

This is an enlarged edition, on the same lines as the earlier ones [cf. **34**, p. 468], of a most useful publication.

Protection des semences confiées au sol. [Protection of seeds in soil.]—*Chim. et Agric., 1958*, 20, pp. 3–10, 4 fig., 1958.

Useful information is presented on seed treatment [**38**, p. 125] against diseases, pests, and both combined. Agrosan GN, agrozene, and nomersan are recommended for disease control and mergamma (a mixture of agrosan GN and isograno) for combined use. Agrozene, a dust based on hexachlorobenzene, is stated to be a specific against wheat bunt [*Tilletia* spp.]. The dosages for individual crops are indicated in a table and full directions for the application of the chemicals are given in the text.

Arman (Pamela) & Wain (R. L.). **Studies upon the copper fungicides. X. The role of leaf exudates in the solution of copper from Bordeaux mixture.**—*Ann. appl. Biol.*, **46**, 3, pp. 366–374, 2 graphs, 1958.

In further studies in this series at Wye College, University of London [**26**, p. 459; cf. **36**, p. 486], evidence was obtained of the presence on leaves of apple and dwarf bean (*Phaseolus vulgaris*) of substances able to dissolve Cu from dried Bordeaux deposit. Extraction of fresh apple leaf blade tissue with water (1/200 w/w) brought into solution about 19 p.p.m. of Cu from Bordeaux mixture, whereas only 0·5 p.p.m. was dissolved by glass-distilled water; in 8 hr. each apple leaf gave sufficient material to dissolve 30–40 μg. Cu. Other evidence also indicated that intact apple leaves can yield substances which take Cu into solution from Bordeaux mixture. These might arise from the leaf tissue, be present as dust, or be of fungal or insect origin, but the effect was shown not to arise from bacterial action. Experimental results suggested that though substances removed by a single washing with water are present on the leaf surface, Cu-dissolving substances are subsequently exuded over a long period. These results are inconsistent with the conception that substances initially present on the leaf surface are slowly entering solution, in which case the amount of Cu dissolved would have decreased continuously, whereas it fell and then rose again.

Severe injuries (50 pin pricks/leaf) increased the amount of dissolved Cu from 0·6–0·7 to 1·14 p.p.m., but natural injuries in the field cannot account for all the Cu-dissolving substances produced from leaves, and intact leaves, it seems, can yield such substances to water. It is concluded that the leaves of the host play an important part in the mode of action of Bordeaux mixture [cf. **37**, p. 74].

Martin (J. T.) & Batt (R. F.). **Studies on plant cuticle. I. The waxy coverings of leaves.**—*Ann. appl. Biol.*, **46**, 3, pp. 375–387, 1958. [36 ref.]

A more detailed account of work already noticed [cf. **37**, p. 73].

Parry (K. E.) & Wood (R. K. S.). **The adaptation of fungi to fungicides: adaptation to copper and mercury salts.**—*Ann. appl. Biol.*, **46**, 3, pp. 446–456, 1958.

In a study at Imperial College, London, it was found that the susceptibility of *Botrytis cinerea* to $CuSO_4$ [cf. **32**, p. 30; **33**, pp. 90, 105] in liquid media increased when the vol. (and therefore depth) of the medium in culture bottles exceeded certain values; when the vol. was 40 ml. the max. conc. permitting growth was 300 p.p.m. By gradually increasing the conc. of $CuSO_4$ a strain of the fungus was subsequently developed which grew at 750 p.p.m., though only if the inoculum was placed at the edge of the liquid.

Spores from the resistant strains were more resistant to $CuSO_4$ than those of the parent. The resistance of the mycelium, and to a lesser extent of the spores, was retained after growth of the resistant strain for 6 months in fungicide-free media. Spores and mycelium grew in much higher concs. of $CuSO_4$ when nutrient media were solidified with agar. The strain resistant in liquid media was not more resistant than the parent on agar.

Resistance was not increased after growth for extended periods on agar containing high concs. of $CuSO_4$. The resistance obtained in liquid media was not lost after growth on agar media for 3 months. Attempts to obtain strains more resistant than the parent to $HgCl_2$ were unavailing. The results with phenyl mercury acetate were similar to those with $CuSO_4$, but the strains ultimately produced were much more resistant (16 to 32 times).

Tröger (R.). **Studien über die Kupferaufnahme in Conidien von Fusarium decemcellulare.** [Studies on copper absorption in conidia of *F. decemcellulare*.]—*Arch. Mikrobiol.*, **26**, 4, pp. 415–422, 1 fig., 1957.

Toxic concs. of $CuSO_4$ (50 μg. Cu/ml.) did not differ from non-toxic ($\frac{1}{2}$–10 μg.) in respect of absorption of Cu by living conidia of *F. decemcellulare* [*Calonectria rigidiuscula*: **36**, p. 110]. Take-up was somewhat more free at pH 8·5–10 than at 6·5–7·5, but was not affected by neutral salts. Cu could still be detected (by means of organic indicators) in conidia that had been washed and boiled after a brief period in Cu solution; 80% of them were germinable unless damaged by heat. The Cu complexes formed in boiled conidia were lipoid-soluble.

Burchfield (H. P.) & Schechtman (Joan). **Absorptiometric analysis of N-(trichloromethylthio)-4-cyclohexene-1,2-dicarboximide (captan).**—*Contr. Boyce Thompson Inst.*, **19**, 5, pp. 411–416, 2 graphs, 1958.

Captan, and the related fungicide phaltan [**37**, p. 620], can be analysed by measuring the intensity of the colour formed when they react with pyridine and tetraethyl ammonium hydroxide. For captan the absorption maximum is 415 mμ and the molar absorbence $1{\cdot}3 \times 10^4$, calculated on the basis of initial conc. The colour intensity diminished by 50% within 2·5 hr. when solutions of captan in phosphate buffer (pH 7) were incubated at 29° C. before adding the reagents, indicating a more rapid hydrolysis than that obtained with some other fungicides containing reactive halogen (cf. *Contr. Boyce Thompson Inst.*, **18**, pp. 395–418, 1956; **19**, pp. 169–176, 1957).

Burchfield (H. P.) & Storrs (Eleanor J.). **Influence of pH and group interactions on the reactivities of metabolites and related compounds containing sulfhydryl groups.**—*Contr. Boyce Thompson Inst.*, **19**, 5, pp. 417–436, 7 graphs, 1958. [50 ref.]

The apparent reactivities of metabolites and related compounds containing sulph-

hydryl groups with the fungicides 1-fluoro-2,4-dinitrobenzene (FDNB) and dyrene [**37**, p. 610] at pH 6 and 29° C. decreased in the order cysteine ethyl ester > mercaptoethylamine > glutathione = cysteine > homocysteine. At pH 7 the apparent reaction rates of cysteine, homocysteine, and glutathione increased 10-fold.

Terry (C. W.), Adams (R. E.), & Parker (K. G.). **A pre-mixer for orchard spray materials.**—*Ext. Bull. Cornell agric. Exp. Sta.* 957, 6 pp., 3 fig., 1956. [Received 1958.]

This experimental premixer, mounted on a 2-wheel trailer, consists of a 200 gal. tank fitted with an agitator (500 rev./min.) and a centrifugal pump (200 gal./min; 20 lb. pressure), both independent and clutch-driven from a 6 h.p. single cylinder, air-cooled engine. Methods of operation vary according to the spray materials, with some of which the agitator alone may give a good suspension. With both circulating pump and agitator in action the machine is easily capable of giving very uniform suspensions of as much as 120 lb. of S paste in 100 gal. spray.

Rautenstein (Y. I.). О путях развития Советской микробиологии за 40 лет. [On the pathways of development of Soviet microbiology over 40 years.]

Imshenetskiĭ (A. A.). Сорок лет изучения изменчивости микроорганизмов в СССР. [Studies of variability in micro-organisms over 40 years in U.S.S.R.]

Kuznetsov (S. I.). Основные итоги по исследованию микрофлоры нефтяных месторождения. [The basic results of investigations into the microflora of oil fields.]

Krasil'nikov (N. A.). О значении почвенных микроорганизмов в питании растений. [On the importance of soil micro-organisms in plant nutrition.]

Mishustin (E. N.). Советская агрономическая микробиология и ее достижения. [Soviet agronomic microbiology and its achievements.]—*Microbiology, Moscow*, **26**, 6, pp. 625–631; 632–650; 651–658; 659–672, 2 pl.; 673–684, 1957. [167 ref.]

These are detailed historical reviews of Soviet research in the past 40 years.

Hirst (J. M.). **New methods for studying plant disease epidemics.**—*Outlook on Agric.*, **2**, 1, pp. 16–26, 8 fig. (3 col.), 4 graphs, 1958. [18 ref.]

The author summarizes recent work at Rothamsted, largely with new instruments, to further knowledge of outbreaks of potato blight (*Phytophthora infestans*) [cf. **36**, p. 814] and apple scab (*Venturia inaequalis*) [cf. **36**, p. 815].

Sreeramulu (T.). **Spore content of air over the Mediterranean Sea.**—*J. Indian bot. Soc.*, **37**, 2, pp. 220–228, 1958.

The fungus spore content of the air 70 ft. above sea-level in Oct.–Nov. 1956 (reported from Andhra University, Waltair, India) was measured with a portable volumetric spore trap [**34**, p. 664]. The presence of a variety of spores up to a distance of 50 miles from the coast was confirmed [cf. **37**, p. 642], the quantities of each spore type varying with the distance from the nearest land. The highest concs. during the entire period were coloured basidiospores 62/m³, *Cladosporium* 45/m³, *Ustilago* 25/m³, *Alternaria* 12/m³, and *Helminthosporium* 5/m³. Those with peak conc. during daytime on land (*Cladosporium*, *Alternaria*, etc.) had a similar occurrence in sea air, but basidiospores and the like with higher conc. at night on land were not significantly more common during the night over the sea.

Brian (P. W.). **The role of toxins in plant disease.**—*Outlook on Agric.*, **2**, 1, pp. 27–32, 1958. [29 ref.]

The author discusses the possible role of toxins in causing the symptoms of a

number of well-known plant diseases; though toxins may play a part, other mechanisms are also involved. Howard's idea of toxin inactivation to alleviate plant disease [**21**, p. 104] is sound in theory but difficult of execution. Inhibition of pectic enzymes, shown by Brown to exert a toxic effect on plant cells [**15**, p. 597], might be feasible, but with this single exception it is probable that search for better fungicides is a more rewarding possibility for improving plant disease control than a search for toxin antidotes.

Baskin (A. D.), Bubernak (J.), Reynolds (S. P.), Oakes (J. B.), & Lyster (H. D.). **Semimicroquantitative analysis of copper 8-quinolinolate. A demonstration of uneven deposition of fungicide on cellulosic materials as a major variable in deterioration evaluation.**—*Amer. Dyest. Reptr*, **47**, 18, pp. 603–608, 1 diag., 2 graphs, 1958.

At the U.S. Army Quartermaster Research and Engineering Center, Natick, Massachusetts, the method described correlated well with that involving relatively large sample determinations from which it was adapted [**36**, p. 261].

The variation in deposition of copper 8-quinolinolate [**37**, p. 213] was demonstrated by analyses of cotton sewing thread treated against mildew [unspecified] with this fungicide and it is concluded that such unevenness in the distribution might be of importance as a cause of poor agreement between successive evaluations in the same laboratory or elsewhere.

Belyakova (Mme L. A.). Пентахлорфенолят натрия как антисептик, предохраняющий клей от плесневения. [Sodium pentachlorophenolate as an antiseptic, protecting glue from mould.]—*Microbiology, Moscow*, **25**, 6, pp. 713–717, 1956. [English summary.]

At the State Library, Moscow, U.S.S.R., the different kinds of glue used for book binding were mixed with Na salts of the chlorophenols or with β-naphthol [**35**, p. 534] and inoculated with *Penicillium roquefortii*, the causal agent of moulding, at 17–19° C. The salts of tetra- and pentachlorophenol were more effective than β-naphthol. A dose of 0·6% sodium pentachlorophenolate is necessary for the protection of wheat flour glue on newspaper but less is needed for filter, linen, and printed paper; potato starch glue should be treated with 0·45%, dextrin glue 0·75%, and animal glue 1%. The treated glues remain colourless and other properties are not affected. Humidity has no effect on the fungicidal activity of pentachlorophenolate, whereas β-naphthol loses its properties after 3 months in damp places.

Cooke (W. B.). **Continuous sampling of trickling filter populations. I. Procedures.** Cooke (W. B.) & Hirsch (A.). **II. Populations.**—*Sewage industr. Wastes*, **30**, 1, pp. 21–27, 1 fig.; 2, pp. 138–156, 1 fig., 4 graphs, 1958.

The technique used in these studies, reported from the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, was a modification of that described by Tomlinson (*J. Inst. Sew. Purif.*, 1941): oven-dried weighed microscope slides, attached to $\frac{1}{4}$ in. mesh galvanized hardware cloth and exposed in a row on the filters were examined at intervals. Slides were dried at room temp. for 24 hr., weighed, and the deposits scraped from the 2 surfaces agitated separately with distilled water in a Waring blendor before plating [**34**, p. 739].

On a high-rate filter the dominant fungi, in order of abundance, were *Fusarium aquaeductuum*, *Geotrichum candidum*, and *Pullularia pullulans*; and on a standard-rate filter *Coniothyrium fuckelii* [*Leptosphaeria coniothyrium*: **37**, p. 76], *F. aquaeductuum*, and *G. candidum*. The fungal population of the former was relatively uniform over the year, though in the spring *F. aquaeductuum* sometimes markedly increased and in cool months *Leptomitus lacteus* sometimes appeared. Standard-rate

filter populations were more erratic, being governed by the intermittent flow of sewage.

Cooke (W. B.). **Nutritional requirements of nine common sewage fungi.**—*Sewage industr. Wastes*, **29**, 11, pp. 1243–1251, 1957. [Received 1958.]

At the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, the nutritional requirements of *Fusarium aquaeductuum*, *F. oxysporum*, *Geotrichum candidum*, *Margarinomyces heteromorphum*, *Penicillium lilacinum*, *P. melinii*, *P. ochrochloron*, *Pullularia pullulans*, and *Trichoderma viride* were studied in pure culture by standard methods [cf. **36**, p. 658] and the findings are presented. Only 2 of these spp. were deficient for a part of their vitamin requirements: *F. aquaeductuum* grew in the absence of thiamine when biotin was present, while the reverse obtained for *P. pullulans*. On the basis of growth on the sampled trickling filters there was no evidence that these fungi are dependent on other organisms for the vitamins for which they are apparently deficient.

Morrison (T. M.). **Host-endophyte relationships in mycorrhizas of Pernettya macrostigma.**—*New Phytol.*, **56**, pp. 247–257, 1 pl. (3 fig.), 6 graphs, 1957. [Received Nov. 1958.]

The growth of *P. macrostigma* [**32**, p. 142] in the natural soil investigated at the University of Otago, New Zealand, was limited by available P. Soil applications of NH_4NO_3 and NaH_2PO_4, singly or combined, reduced mycorrhizal infection, except with high NaH_2PO_4 alone, which produced stunted plants with intense mycorrhizal infection. In a soil in which *Pinus radiata* [**37**, p. 760] grew better with mycorrhiza than without, *Pernettya macrostigma* behaved similarly, but in a more fertile soil in which mycorrhizal and non-mycorrhizal pine grew equally well, non-mycorrhizal *P. macrostigma* grew better. The mycorrhizal fungus of the latter can apparently persist better than that of pine under conditions favouring the growth of uninfected plants.

Pethő (M.). **A környezeti tényezők hatása a Trichothecium roseum konidiumképzésére.** [The influence of external conditions on the formation of conidia in *T. roseum*.]—*Acta Univ. debrecen.*, **3** (*1956*), 2, pp. 131–141, 1957. [English summary. Abs. in *Referat. Zh. Biol.*, *1958*, 12, p. 107–108, 1958.]

The growth of the mycelium of *T. roseum* [**33**, p. 379] increased in disaccharide media, and conidial production with monosaccharides. Biotin and inositol, which can be replaced by asparagine and hydrolysed casein, are essential for normal growth. Nicotinic and pantothenic acids and vitamins B_1, B_2, and B_6, as well as direct light [**36**, p. 115] increased the formation of conidia.

Suryanarayanan (S.). **Thiamine, its intermediates and growth of Piricularia spp. and Sclerotium oryzae.**—*Phytopath. Z.*, **33**, 4, pp. 341–348, 1 fig., 1958. [German summary.]

In further work at the University Botany Laboratory, Madras, the response of different spp. and isolates of *Piricularia* [**35**, p. 386] and *S. oryzae* to thiazole and pyrimidine was sometimes dependent on the type of substrate sugar present in the medium, though *S. oryzae* could complete the synthesis of thiamine, given only pyrimidine, regardless of the C source. *P. oryzae*, on the other hand, required only pyrimidine when the sugar was sucrose or maltose, but with xylose, glucose, and fructose, it needed both fractions, as did *P. setariae*, *P. zingiberi*, and other *P.* spp. from grasses and wheat. The validity of grouping fungi into the 4 groups of Robbins (*Proc. nat. Acad. Sci., Wash.*, **24**, pp. 53–56, 1938), according to the degree of their thiamine heterotrophy on any one single medium, is discussed.

Singh (R. K.). **Comparative study of Fusarium moniliforme Sheldon and Cephalosporium sacchari Butler.**—*Sci. & Cult.*, **24**, 3, pp. 135–137, 1958.

The enzymatic activity of *F. moniliforme* [*Gibberella fujikuroi*] and *C. sacchari*, both isolated from sugarcane in India, and grown on 8 different media, was tested at the Imperial College of Science and Technology, London, by their ability to macerate standard, turgid potato disks 0·5 mm. thick. In potato and tomato extracts *G. fujikuroi* produced a pectolytic enzyme with reaction times of 80–90 and 40–45 min., respectively, whereas no such enzyme was obtained from *C. sacchari*. In pathogenicity tests the latter attacked apples, tomatoes [**36**, p. 359], and potatoes but produced a measurable rot in tomatoes only; *G. fujikuroi* attacked apples, tomatoes, and potatoes with considerable rot in the 1st 2, while in potato rotting was checked by the formation of a cork layer.

Lakshminarayanan (K.). **Lipase formation by Fusarium vasinfectum Atk.**—*Enzymologia*, **19**, 1, pp. 59–64, 1958. [German summary.]

Lipase from *F. vasinfectum* [cf. **37**, p. 585] extracted at the University Botany Laboratory, Madras, India, by a method described, showed max. activity on triacetin at pH 6·8 and olive oil at 7; opt. temps. were 35 and 37° C., respectively; hydrolysis was at a max. after 5 and 3 hr.

Maruzzella (J. C.) & Henry (P. A.). **The antimicrobial activity of perfume oils.**—*J. Amer. pharm. Ass.*, Sci. Ed., **47**, 7, pp. 471–476, 1958.

The results are given of tests by the filter paper disk method with 100 perfume oils on cultures of 10 spp. each of bacteria and fungi at the Biology Dept, Long Island University, Brooklyn, New York. The efficacy of the substances was remarkable, especially against the fungi. The max. activity against *Erwinia carotovora* (the most vulnerable of the bacteria) was exerted by almond S, inhibition zone 73 mm.; with *Aspergillus niger* and citrus odour No. 50 B it was 35 mm.; and with *Nigrospora panici* and lemon bouquet No. 58 50 mm.

Bandelin (F. J.). **The effect of pH on the efficiency of various mold inhibiting compounds.**—*J. Amer. pharm. Ass.*, Sci. Ed., **47**, 10, pp. 691–694, 1958.

Tests were performed at Flint, Eaton & Co., Decatur, Illinois, with 12 preservatives (up to 0·2%) at pH 3, 5, 7, and 9 against *Aspergillus niger*, *Penicillium citrinum*, *Alternaria solani*, and *Chaetomium globosum* on a modified Sabouraud's agar enriched with yeast extracts. Absence of visible growth after a 14-day incubation period at 30° C. was the criterion of inhibition.

Benzoic, salicylic, propionic, and sorbic acids all lost activity with a rising pH. Kojic acid was the least effective inhibitor at all levels. Dehydroxyacetic acid was highly active in the acid range but deteriorated in the alkaline. As the activity of *p*-hydroxybenzoic acid esters was only slightly affected by pH changes they are likely to prove the most useful as preservatives for pharmaceutical preparations in general. Vanillin and ethyl vanillin also appeared to possess marked preservative properties, which undergo little change even at high pH levels.

Ark (P. A.) & Thompson (J. P.). **Prevention of antibiotic injury with Na-K-chlorophyllin.**—*Plant Dis. Reptr*, **42**, 11, pp. 1203–1205, 3 fig., 1958.

In tests at the University of California, Berkeley, the addition of 1% Na-K-chlorophyllin [**38**, p. 111] to aqueous solutions of actidione (25 p.p.m.), aureomycin (500 p.p.m.), patulin (100 p.p.m.), streptomycin (1,000 p.p.m.), or terramycin (500 p.p.m.), before they were sprayed on to Pinto beans [*Phaseolus vulgaris*] and Marketer cucumbers under strong light in a greenhouse, completely inhibited the chlorosis and necrosis that occurred when the antibiotics were used alone. A 0·2% solution gave only partial protection.

Мента (P. P.). **Some properties of vancomycin in relation to its absorption and movement in plants.**—*Diss. Abstr.*, **18**, 2, pp. 356–357, 1958.

At the University of Illinois the heat labile vancomycin was active against Gram+ bacteria, a min. conc. of 0·1 μg./ml. checking the growth of *Corynebacterium tritici in vitro*. It was readily absorbed by both excised and unexcised leaves, the downward translocation from treated leaves being more rapid than upward. It was also absorbed via roots and was distributed through the plant system at 50 μg./ml. in 3 hr. (6 hr. in capsicum). It was deactivated more readily in leaves of tobacco, tomato, and Lima bean [*Phaseolus lunatus*] than in cucumber; the rate of degradation was related to the amount absorbed. Vancomycin was non-phytotoxic and did not affect germination of the test plants, watermelon, or pea. It was deactivated when watered on to soil.

Білаї (V. I.). Летучие антибиотики у грибов рода **Trichoderma Pers.** [Volatile antibiotics in fungi of the genus *Trichoderma*.]—*Microbiology, Moscow*, **25**, 4, pp. 458–465, 1956.

In tests at the Microbiological Institute of the Ukrainian Academy of Science, U.S.S.R., of over 400 strains of *Trichoderma*, strains 5320 and 80 produced volatile substances very effective against fungi [**36**, p. 485] and bacteria. The growth of *Bacterium* [*Xanthomonas*] *malvacearum*, however, was arrested only by strain 5320 when cultures were 18–20 days old, whereas the spore formation of *Fusarium oxysporum* and *Verticillium dahliae* was arrested by those 5 days old.

Řeháček (Z.). **Produkce antifungálního antibiotika nově isolovanou aktinomycetou.** [Production of an antifungal antibiotic from a newly isolated actinomycete.]—*Čsl. Mikrobiol.*, **3**, 1, pp. 27–31, 1958. [Russian and English summaries.]

Studies are described on the taxonomy and antifungal properties of actinomycete 943 (considered identical with *Actinomyces* [*Streptomyces*] *globisporus flaveolus* and very close to *S. alboflavus*). A substance produced by 943 is effective against *Candida albicans* and Fusaria, but has little effect on bacteria. The unrefined antibiotic was readily soluble in the lower alcohols, less so in diethylether, and almost insoluble in water. It was stable at pH 7 and was 50% inactivated by boiling for 60 min.

Naumann (K.). **Über das Verhalten verschiedener morphologischer Rassen von Helminthosporium papaveris Saw. gegenüber unterschiedlich aktiven Strahlenpilzstämmen.** [On the reaction of different morphological strains of *H. papaveris* to actinomycete strains of differing activity.]—*Arch. Mikrobiol.*, **28**, 4, pp. 417–442, 5 fig., 5 graphs, 1958. [84 ref.]

At the Institut für allgemeine Botanik, Friedrich-Schiller University, Jena, Germany, 6 of Dolle's actinomycete strains [**34**, p. 320] and 2 of Gemeinhardt's were tested against *H. papaveris* [*Pleospora papaveracea*: **37**, p. 733]. The tests with the 6 active strains of the fungus and the standard HD [loc. cit.] were collated and the 'relative width of the zone of inhibition' was established as a basis for comparison. The dimensions of the inhibition zones of all the other *P. papaveracea* strains, after testing with 1 each of the 6 active streptomycetes, agreed substantially with those obtained with HD. The initially much larger zones of inhibition became stable on the 6th or 7th day.

New isolates and a sector variant of *P. papaveracea*, as well as a strain of *H. sativum* [*Cochliobolus sativus*] showed, in contrast to *Colletotrichum atramentarium*, no notable changes in reaction from the standard strain, though there were some deviations when dissociates of several antagonists and 8 further streptomycete

strains were used. In many cases a direct attack on the hyphae by the streptomycetes was observed.

Repeated sterilization of the test media had a delaying effect on the growth and activity of the streptomycetes, in particular when the agar was not added until before the last heating.

Vasudeva (R. S.), Subbaiah (T. V.), Sastry (M. L. N.), Rangaswamy (G.), & Iyengar (M. R. S.). **'Bulbiformin', an antibiotic produced by Bacillus subtilis.**—*Ann. appl. Biol.*, **46**, 3, pp. 336–345, 1 fig., 7 graphs, 1958.

Further work at the Indian Agricultural Research Institute, New Delhi, on the antibiotic produced by *B. subtilis* [cf. **34**, p. 665] showed that it was effective against 16 of 25 fungi tested, in the spores and hyphae of which (if chitin was present in the cell-wall) it produced a characteristic bulb formation, and is therefore named bulbiformin. Inhibition of 5 fungi, including *Alternaria tenuis* and *Fusarium udum*, was very marked. The intensity of bulb formation varied as log. conc., and it would appear that inhibition and bulb formation are not due to 2 different substances. Though the same type of response was secured with both autoclaved and unautoclaved culture filtrates, the extent of inhibition was consistently higher in the latter, indicating that the substance is thermolabile.

Max. antibiotic production required 30 p.p.m. Mg. With Mg deficiency growth and antibiotic production in dextrose-asparagine-phosphate were almost negligible. The antibiotic was not intracellular, but was excreted into the medium.

Gukasyan (A. B.). Прибор для микробиологического посева почвы комочками. [A device for microbiological inoculation from soil in clumps.]—*Microbiology, Moscow*, **27**, 3, pp. 393–395, 1 pl., 2 fig., 1958. [English summary.]

This device, developed at the Biological Institute of the West Siberian Branch of the Soviet Academy of Sciences, consists of a metal plate with 50 metal pins, 35×3 mm., fixed at equal distances (1 cm.). The pin tips are slightly rough. After sterilization it is immersed in the soil and then imposed without pressure on the surface of agar.

Belyaev (G. N.). Влияние длительного применения удобрений на микрофлору дерново-подзолистой связно-песчаной почвы. [The effect of prolonged application of fertilizers on the microflora of turf-podsol cemented sandy soil.]—*Microbiology, Moscow*, **27**, 4, pp. 472–477, 2 fig., 1958. [English summary.]

Experiments by the Solikam Agricultural Experiment Station, U.S.S.R., showed that prolonged application of NPK fertilizers without lime produced dead patches in turf. There was a noticeable increase of fungi, especially *Penicillium implicatum*, *P. multicolor*, and *Mucor hiemalis*. Manure stimulated *Trichoderma* and lime markedly increased the number of actinomycetes.

Harder (R.) & Uebelmesser (Esther). **Notiz zur Frage des Vorkommens von Chytridineen und anderen Pilzen in tiefen Bodenschichten.** [A note on the question of the occurrence of Chytridineae and other fungi in deep soil layers.]—*Arch. Mikrobiol.*, **26**, 4, pp. 353–357, 1957.

Soil samples (Keuper clay-sand) collected during excavations at the Botanisches Institut, University of Göttingen, Germany, in 1953 yielded chytrids, including *Karlingia rosea*, down to 1·55 m. below the surface [cf. **34**, p. 62], 4 isolates of *Pythium* (down to 355 cm. in 1 sample), Mucorineae (regularly down to 120 cm.), and fungi with septate hyphae (2 m.).

Aschner (M.). **Isolation of Labyrinthula macrocystis from soil.**—*Bull. Res. Coun. Israel*, Sect. D, **6**, 3, pp. 174–179, 1 pl. 1958.

At the Haifa Institute of Technology *L. macrocystis* [**24**, p. 377], isolated from soil round the roots of diseased papaw plants, was able to survive for at least 1 month in ordinary garden soil, from which it invaded the roots of white mustard and wheat seedlings via the root hairs. The development of the invaded plants was not impaired. The organism grew well on water agar with various bacteria and yeasts as food sources and tolerated high salinity (sea water).

Jackson (R. M.). **Some aspects of soil fungistasis.**—*J. gen. Microbiol.*, **19**, 2, pp. 390–401, 3 diag., 1958.

In further experiments [**37**, pp. 398, 633] at Rothamsted Experimental Station 8 fungi with a range of sensitivity to soil fungistasis were selected as a result of agar disk and buried-slide [**33**, p. 627] tests with a Rothamsted soil. Six of 7 other soils tested by the first method showed a similar spectrum of inhibition; the 7th was a very acid, raw humus soil, which inhibited only *Acrostalagmus cinnabarinus* [*Nectria inventa*]. The effect of fertilizers on fungistasis in Rothamsted plots was through their influence on soil acidity, low pH being associated with reduced inhibition. As germination of pre-incubated spores was little affected by soil fungistasis, it is inferred that spores are most sensitive at an early stage of germination.

Wotton (W. I.) & McLarty (H. R.). **Steam-operated equipment for the partial sterilization of soil, flats and pots.**—*Canad. J. Pl. Sci.*, **38**, 4, pp. 424–429, 5 fig., 1958.

The equipment, described from the Canada Dept Agric., Summerland, B.C., consists of 2 units with a common source of steam. The soil sterilizing unit [cf. **30**, p. 245] consists of an 8 ft. long, 14 in. diam. cylinder (e.g., 2 40-gal. hot water tanks welded together) with a perforated steam pipe running along the centre. The cylinder, within an outer wooden box and insulated with vermiculite, slopes down 6 in. and rotates on rollers to allow about 1 cu. yd. of soil, the entry of which from a hopper is regulated by a sliding gate, to pass along it in 1 hr. (about $2\frac{1}{2}$ gal. soil entering/min., passing through in 5 min.). The soil is raised to the temp. of 175–180° F.

The pot and flat pasteurizer is a plywood, metal-lined box, also vermiculite insulated, 16 ft. × 21 in. × 21 in. outside, with 2 perforated steam pipes running lengthwise on 1 side. The pots and flats are subjected to steam for 3 min. and then pushed to the exit end with an iron rod. The treatment kills fungi and non-spore-forming types of bacteria.

Bussler (W.). **Manganmangelsymptome bei höheren Pflanzen. Manganvergiftung bei höheren Pflanzen.** [Manganese deficiency symptoms in higher plants. Manganese toxicity in higher plants.]—*Z. PflErnähr. Düng.*, **81 (126)**, 3, pp. 225–242, 6 fig.; pp. 256–265, 5 fig., 1958. [35 ref.]

The author's observations on 11 vars. of peas and a number of other plants at the Institut für Pflanzenernährung, Technical University, Berlin, agreed in the main with those of other workers. Typical features of Mn deficiency [cf. **35**, p. 65] are spot chlorosis and the spot necrosis which develops subsequently near the smallest veins on young leaves. The symptoms occur independently of the form of N supplied and are clearly distinguishable from those of Mn toxicity. The element operates primarily in the assimilation parenchyma of young leaves. Peas, beans (*Phaseolus vulgaris*), sunflower, and *Agrostemma githago* were also used for studies on excess Mn, the symptoms of which are described and differentiated from those of deficiency in a table. Toxicity is manifested by excretion of MnO_2 from the vacuoles

in the basal cells of the epidermal hairs and from the root cap or cortex; intensive green or blue-green reaction to Arnold's stain in the secondary layers of the vessel walls; and absence of initial effects in the assimilation parenchyma.

Poitras (A. W.). **Occurrence and importance of certain aquatic phycomycetes in Alabama.**—Abs. in *J. Ala. Acad. Sci.*, **29**, p. 84, 1957.

As records of aquatic phycomycetes in Alabama appear to be scanty, an investigation is in progress at the Polytechnic Institute, Auburn, to determine the species and their significance in the causation of diseases of game fish [cf. **34**, p. 739] and their eggs. During 1956 water samples from streams and ponds in 46 localities in the S.E. were baited with sterile halves of hemp seed and rosaceous fruits and maintained in the laboratory. The species of *Saprolegnia* most frequently isolated from this material were *S. diclina*, *S. ferax*, and *S. mixta*, and of *Achlya* [cf. **36**, p. 276] *A. americana*, *A. colorata*, and *A. flagellata*. *S. parasitica* [**26**, p. 395], *S. ferax* [**35**, p. 85], and *A. flagellata* [cf. **32**, pp. 205, 646] were isolated from diseased fish.

Gremmen (J.). **Bemerkungen über einige Cenangium ferruginosum ähnliche Pilze.** [Observations on a number of fungi resembling *C. ferruginosum*.]—*Phytopath. Z.*, **33**, 4, pp. 371–374, 1 fig., 1958. [English summary.]

Five inoperculate discomycetes, which closely resemble *C. ferruginosum* [cf. **34**, p. 324; **37**, p. 710] and are often confused with it, are described from the Forstliche Versuchsanstalt 'De Dorschkamp', Wageningen, Netherlands. This fungus has often been considered a serious parasite of conifers but the author considers this an error and attributes it to the fact that *C. ferruginosum* resembles other discomycetes. It is a genuine saprophyte and occurs only on *Pinus*.

Neergaard (P.). **Infection of Danish seeds by Rhizoctonia solani Kuehn.**—*Plant Dis. Reptr*, **42**, 11, pp. 1276–1278, 1958.

Further testing [**38**, pp. 54, 169] showed *R.* [*Corticium*] *solani* to be present from time to time in seed of various crucifers including radish, results for 1953–58 being tabulated, and also occasionally in that of chicory, carnation, lettuce, spinach, clover, zinnia, pansy, and *Impatiens balsamina*.

Schwinghamer (E. A.). **The relation of survival to radiation dose in rust fungi.**—*Radiation Res.*, **8**, 4, pp. 329–343, 1958. [*Biol. Abstr.*, **32**, 11, p. 3229, 1958.]

In studies at Brookhaven National Laboratory, Upton, New York, quantitative inoculation of [unspecified] host seedlings and infection counts proved the most useful method of evaluating the survival of rust uredospores exposed to X-rays, γ-rays, and neutrons; inhibition of germination occurred only at dosages much higher than those needed for the inhibition of infection. With UV light the curves obtained were similar for both survival criteria. Calculated target numbers for *Melampsora lini* and *Puccinia graminis* f.sp. *tritici* were 4 and 2, respectively. The calculated sensitivity of *M. lini* spores to X-rays, γ-rays, and neutrons was approximately twice that for *P. g.* f.spp. *avenae* and *tritici* and *P. coronata* f.sp. *avenae*; with UV light the corresponding ratio of sensitivity was 10:1. Spore sensitivity to UV light, X-rays, and γ-rays increased sharply above a spore moisture content of 45%. The X-ray sensitivity of hyphae of *M. lini* [in flax] was 10 times that of spores irradiated at a comparable level of hydration.

Castellani (E.), Matta (A.), & Guerzoni (C.). **Effetti patologici dei raggi beta su un fungillo fitopatogeno.** [Pathological effects of beta rays on a phytopathogenic fungus.]—*Minerva nucleare*, **2**, 3, pp. 56–59, 1 pl. (10 fig.), 1958.

At the University of Turin conidia of *Gloeosporium musarum* were exposed to β-rays from a betatrone (31 Mev.) at 16,500–830,000 r. and then cultured in Malan's

micro-chambers [**36**, p. 201]. Germination was virtually inhibited by over 300,000 r.; lower levels induced modifications in the shape and internal structure of spores and germ tubes which became progressively more frequent above 50,000 r. These modifications are regarded as signs of a true radiation disease, properly so-called.

Henssen (A.). **Beiträge zur Morphologie und Systematik der thermophilen Actinomyceten.** [Contributions to the morphology and systematics of the thermophile actinomycetes.]—*Arch. Mikrobiol.*, **26**, 4, pp. 373–414, 41 fig., 1958.

Full descriptions of the morphology and physiology are given of 11 actinomycetes (8 are new) isolated from stable manure at the Biologische Bundesanstalt für Land- und Forstwirtschaft, Berlin-Dahlem. Three new genera are suggested: *Thermomonospora*, differentiated from *Streptomyces* [**38**, p. 69] in that the spores are produced singly on undivided aerial hyphae; *Thermopolyspora*, with spores in short chains; and *Pseudonocardia*, producing spores from both septate submerged and aerial mycelium. Keys to the genera and species are given.

Emeis (C.-C.) & Gutz (H.). **Eine einfache Technik zur Massenisolation von Hefesporen.** [A simple technique for the mass isolation of yeast spores.]—*Z. Naturf.*, **13b**, 10, pp. 647–650, 2 fig., 1958.

An expanded account of the procedure already outlined [**38**, p. 70].

Deighton (F. C.) & Tinsley (T. W.). **Notes on some plant virus diseases in Ghana and Sierra Leone.**—*J. W. Afr. Sci. Ass.*, **4**, 1, pp. 4–8, 1958.

This provisional list of diseases known or suspected to be of virus origin in plants of 31 families [cf. **36**, p. 7; **37**, p. 515] is intended as a stimulus to further work.

Björling (K.) & Ossiannilsson (F.). **Investigations on individual variations in the virus-transmitting ability of different aphid species.**—*Socker*, **14**, 1, pp. 1–13, 1 diag., 1958.

In 1954–57 large-scale greenhouse tests were made at the Institute of Plant Pathology and Entomology, Uppsala, Sweden, to determine the capacity of some 100 asexually reared strains of *Myzus persicae*, *M. ascalonicus*, *Aphis fabae*, *Aulacorthum circumflexum*, *A. solani*, and *Macrosiphum euphorbiae* for the transmission of beet yellows [**34**, p. 567] and potato leaf roll viruses [**35**, p. 154]. Significant and in several cases statistically assured differences, apparently determined by genetic factors, were demonstrated between individual strains of *Myzus persicae* for both viruses [cf. **35**, p. 341], and between a few strains of *Aphis fabae* and *M. ascalonicus* for beet yellows. *M. persicae* proved the most efficient of these 3 spp. in the transmission of beet yellows and better than the best strain of *M. ascalonicus* and 1 of *Aulacorthum circumflexum* in that of potato leaf roll. Within the population of *M. persicae* investigated 85 strains could be grouped in a continuous series giving 10–80% average infection frequency.

Meĭsel' (N. N.), Gutkina (Mme A. V.), & Mastyukova (Mme Y. N.). О люминесцентно-микроскопическом выявлении вирусов. [On the luminescent-microscopic appearance of viruses.]—*Microbiology, Moscow*, **27**, 4, pp. 513–519, 1 pl., 1 fig., 1958.

A detailed description is given of the microscope used at the Microbiological Institute, Academy of Sciences, U.S.S.R., and the methods of virus infection and culturing.

Sukhov (K. S.). Проблема наследственной изменчивости фитопатогенных вирусов. [Problems of inherited changes in phytopathogenic viruses.]—*Trud. Inst. Genet., Moscow, 1958*, 24, pp. 117–137, 11 fig., 1958.

In this paper, read at the International Symposium on Genetics at Tokyo, 6 Sept.

1956, the effect of heat on various viruses, especially tobacco mosaic virus (TMV) is described. When *Nicotiana glutinosa* leaves infected by a virulent strain of TMV were kept in a moist chamber for 3 days at 19–37·5° C. a series of new strains showing a progressive loss of pathogenicity were obtained at temps. above 28·5°. These strains gave fewer local lesions and less necrosis, which were practically non-existent in the strain obtained at 37·5° C. The stability of these new strains was established by numerous inoculations. The author claims that the new strains are developed as a result of a change in the virus structure. The hyaline hexagonal crystalline X-bodies in the leaf hairs become spindly and opaque.

Mixed inoculation of tobacco leaves with the X_2 strain of potato virus X and TMV produced a new strain, X_3, more virulent and pathogenic than X_2. This phenomenon occurs only when there is a simultaneous infection by non-related viruses.

Terekhova (Mme N. A.). О размноженнии вируса мозаичной болезни Табака в бактериальных опухолят Помидоров. [On the multiplication of Tobacco mosaic virus in bacterial tumours of Tomatoes.]—*Microbiology, Moscow*, **25**, 2, pp. 227–230, 1 graph, 1956. [Received 1959. English summary.]

At the Microbiological Institute, Moscow, U.S.S.R., tumours of *Bacterium* [*Agrobacterium*] *tumefaciens* were successfully needle-inoculated with tobacco mosaic virus. The virus titre was greater in the tumours than in the leaves and was detected 7–8 days after inoculation. Virus inoculated into the leaf penetrated to the tumour in 14 days, whereas in the reverse procedure it was not detected in the leaves until 2 months later.

Blattný (C.). **Koexistence kmenů VTM ve Physalis franchettii a jejich reisolace. Physalis alkekengi jako příznakový hostitel zeleného kmene VTM typ.** [The co-existence of TMV strains in *P. franchettii* and their re-isolation. *P. alkekengi* as a symptomless carrier of a green strain of TMV.]—Abs. in *Preslia*, **30**, 4, pp. 358–359, 1958. [English summary.]

Following inoculation of *P. franchettii* with the green strain of tobacco mosaic virus at the Institute for Virology, Prague, the plant was infected 1 yr. later also with a yellow strain. After 3 yr. both strains were separated by rubbing to *Nicotiana glutinosa* and tobacco.

The yellow strain produces on *P. alkekengi*, a symptomless carrier of the green, strong white discoloration. Repeated inoculation of seedlings with the green strain induced yellowish discolorations in some plants along the main veins.

Izard (C.) & Berg (T.). **Une nouvelle méthode d'identification des virus TMV et X. Application a l'étude des relations entre l'Orobanche et le Tabac, en présence de ces deux virus.** [A new method of identification of the TMV and X viruses. Application to the study of the relations between *Orobanche* and Tobacco in the presence of these two viruses.]—*C.R. Acad. Sci., Paris*, **247**, 18, pp. 1526–1529, 1958.

The method used in the studies at the Institut Expérimental des Tabacs, Bergerac, is based on a combination of circular chromatography and precipitation of an antigen–antibody system. Tobacco plants parasitized by *Phelipaea* [*Orobanche*] *ramosa* [cf. **17**, p. 210] were inoculated with tobacco mosaic virus, 4 on the tobacco and 2 on *O. ramosa*, and 3 with [potato virus] X (on *O. ramosa*).

The results demonstrated that TMV is capable of multiplication in parasitized tobacco plants; neither virus was transmissible by inoculation to *O. ramosa*. TMV did not pass from infected tobacco roots to the parasite. The symptoms in the inoculated plants were mild, but no sign of an inhibitor occurring in *O. ramosa* and

transmissible to tobacco could be detected by Crowley's technique [**35**, p. 344]. A possible explanation of the attenuation of the virus lies in the relatively high arginine content of *O. ramosa*, which might interfere with the N metabolism of its host.

Praceus (Christel). **Anatomische Untersuchungen an Enationen von Aspermie-Virus infizierten Pflanzen.** [Anatomical studies on enations on plants infected with aspermy virus.]—*Phytopath. Z.*, **33**, 3, pp. 248–262, 12 fig., 1958. [English summary.]

Two developmental types of enation on the lower surface of leaves of *Nicotiana glutinosa* and tomato inoculated with tomato aspermy virus [**32**, p. 457] are described from the Phytopathologische Institut, Martin Luther University, Halle-Wittenberg, Germany. In the 1st type undifferentiated parenchymatous proliferations on the lower surface become differentiated into palisade and spongy parenchyma cells. In the 2nd they arise by the formation of palisade cells on the lower surface of the leaf and by repeated cell divisions around the margin, the number of cell layers in the cross-section of the leaf being reduced from 7 to 6. 'Ruffles' [**32**, p. 456], genetically conditioned enations forming on the upper surface, are anatomically similar to the aspermy enations. On the other hand the 'toad-skin' type of genetic enation is made up of parenchymatous proliferations which only rarely become differentiated. All these enations arise from anomalous cell divisions of the parenchyma.

Protsenko (A. E.). Электронноскопия фитопатогенных вирусов. I. Вирус желтухи Астр. [Electron micrography of phytopathogenic viruses. I. Aster yellows virus.]—*Microbiology, Moscow*, **27**, 1, pp. 131–132, 1 pl., 1 graph, 1958. [English summary.]

The particles of aster yellows virus from 6 naturally and artificially infected host species studied at the Microbiological Institute, Academy of Sciences, U.S.S.R., proved to be minute, uniform, and 30–50 mμ diam. (most frequently 38 mμ); they were not observed in healthy plants.

Amelunxen (F.). **Die Virus-Eiweißspindeln der Kakteen. Darstellung, elektronenmikroskopische und biochemische Analyse des Virus.** [The virus protein bodies of Cacti. Description, electron microscopic and biochemical analysis of the virus.]—*Protoplasma*, **49**, 1, pp. 140–178, 17 fig., 4 graphs, 1958. [63 ref.]

A detailed account is given of studies at the Botanisches Institut, Westfälische Wilhelms Universität, Münster, Germany, on the occurrence in *Opuntia* (spp.) and *Epiphyllum truncatum* of X-bodies and a multiplicity of forms of fibrillar inclusions [**35**, p. 746]. The particles of the virus, measuring 500 or 520 mμ (max. frequencies) $\times$ 22 mμ, disintegrate on dilution with twice-distilled water into disks 100–150 A diam. The process increases with age but is masked by the formation of fusiform aggregates, $7{\cdot}5 \times 0{\cdot}7\,\mu$. The infectivity of the particles was confirmed by inoculation experiments.

Weber (F.) & Reiter (Liselotte). **Virus-Einschlußkörper in nichtvariegaten Zimmeräonien.** [Virus inclusion bodies in non-variegated indoor *Aeonium*.]—*Protoplasma*, **49**, 1, pp. 179–181, 2 fig., 1958.

As in variegated specimens of *Aichryson* [*Sempervivum*] *domesticum*, non-variegated plants examined at the Institut für Anatomie und Physiologie der Pflanzen, University of Graz, Austria [**37**, p. 80], also contained particularly well-developed X-bodies full of granules.

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AUTHORS' NAMES

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NOTE: 'Beet curly top' virus in Bulgaria (*R.A.M.*, **37**, p. 326) is not identical with the virus of the same name in America.